U.S. Department of Transportation
Federal Aviation Administration

# A Plan for the Future

## 10-Year Strategy for the Air Traffic Control Workforce

2013 – 2022

2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

This 2013 report is the FAA's eighth annual update to the controller workforce plan. The FAA issued the first comprehensive controller workforce plan in December 2004. It provides staffing ranges for all of the FAA's air traffic control facilities and presents actual onboard controllers as of September 22, 2012.

Section (221) of Public Law (108-176) (updated by Public Law 111-117) requires the FAA Administrator to transmit a report to the Senate Committee on Commerce, Science and Transportation and the House of Representatives Committee on Transportation and Infrastructure that describes the overall air traffic controller workforce plan. It is due by March 31 of each fiscal year, otherwise the FAA's appropriation is reduced by $100,000 for each day it is late.

DUE TO THE TIMING OF THE REQUIREMENT TO PRODUCE THE PLAN BY MARCH 31 TO AVOID A DAILY FINE OF $100,000 PER PUBLIC LAW 111-117, THIS PLAN DOES NOT REFLECT THE POTENTIAL EFFECTS OF SEQUESTRATION. THE FAA WILL ADJUST THE ACTUAL STAFFING AND HIRING FORECASTS TO REFLECT FUTURE FUNDING LEVELS AS THEY BECOME MORE CERTAIN.

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# Executive Summary

## Safety is the top priority of the Federal Aviation Administration (FAA) as it manages America's National Airspace System (NAS). Thanks to the expertise of people and the support of technology, tens of thousands of aircraft are guided safely and expeditiously every day through the NAS to their destinations.

### Workload

An important part of managing the NAS involves actively aligning controller resources with demand. The FAA "staffs to traffic," matching the number of air traffic controllers at its facilities with traffic volume and workload. The FAA's staffing needs are dynamic due to the dynamic nature of the workload and traffic volume.

### Traffic

Air traffic demand has declined significantly since 2000, the peak year for traffic. For the purposes of this plan, air traffic includes aircraft that are controlled, separated and managed by air traffic controllers. This includes commercial passenger and cargo aircraft as well as general aviation and military aircraft. In the past decade, volume has declined by 24 percent and is not expected to return to 2000 levels in the near term.

### Headcount

System-wide controller headcount is slightly lower than in 2000 but on a per-operation basis, the FAA has more fully certified controllers on board today than in 2000.

In many facilities, the current Actual on Board (AOB) number may exceed the range. This is because many facilities' current AOB (all controllers at the facility) numbers include many developmental controllers in training to offset expected future attrition. Individual facilities can be above the range due to advance hiring. The FAA hires and staffs facilities so that trainees are fully prepared to take over responsibilities when senior controllers retire.

### Retirements

Fiscal year 2012 retirements were below projections, and slightly higher than FY 2011 actuals, while 2013 retirements are tracking slightly above projections. In the last five years, 2,883 controllers have retired. The FAA carefully tracks actual retirements and projects future losses to ensure its recruitment and training keep pace.

### Hiring

In the last five years, the FAA has hired more than 6,600 new air traffic controllers. We plan to hire more than 6,200 new controllers over the next five years to keep pace with expected attrition and traffic growth.

## Training

As the FAA continues to bring these new employees on board, the training of these new employees continues to be closely monitored at all facilities. We must carefully manage the process to ensure that our trainees are hired in the places we need them and progress in a timely manner to become certified professional controllers (CPC). The FAA will also continue to take action at the facility level should adjustments become necessary due to changes in traffic volume, retirements or other attrition.

In FY 2012, the FAA continued its efforts from an Independent Review Panel that focused on air traffic controller selection, assignment and training. The panel, part of a nationwide Call to Action on air traffic control safety and professionalism, delivered its comprehensive set of recommendations to the agency for review and implementation. The FAA has begun to develop action plans to address the recommendations.

Ongoing hiring and training initiatives, as well as increased simulator use, are helping the FAA meet its goals. While the FAA is managing today's air traffic, we must also integrate new technologies into air traffic operations. From state-of-the-art simulators to satellite technology, air traffic is evolving into a more automated system. The FAA is working diligently to ensure well-trained controllers continue to uphold the highest safety standards as we plan for the future.

> The FAA's goal is to ensure that the agency has the flexibility to match the number of controllers at each facility with traffic volume and workload. Staffing to traffic is just one of the ways we manage America's National Airspace System.

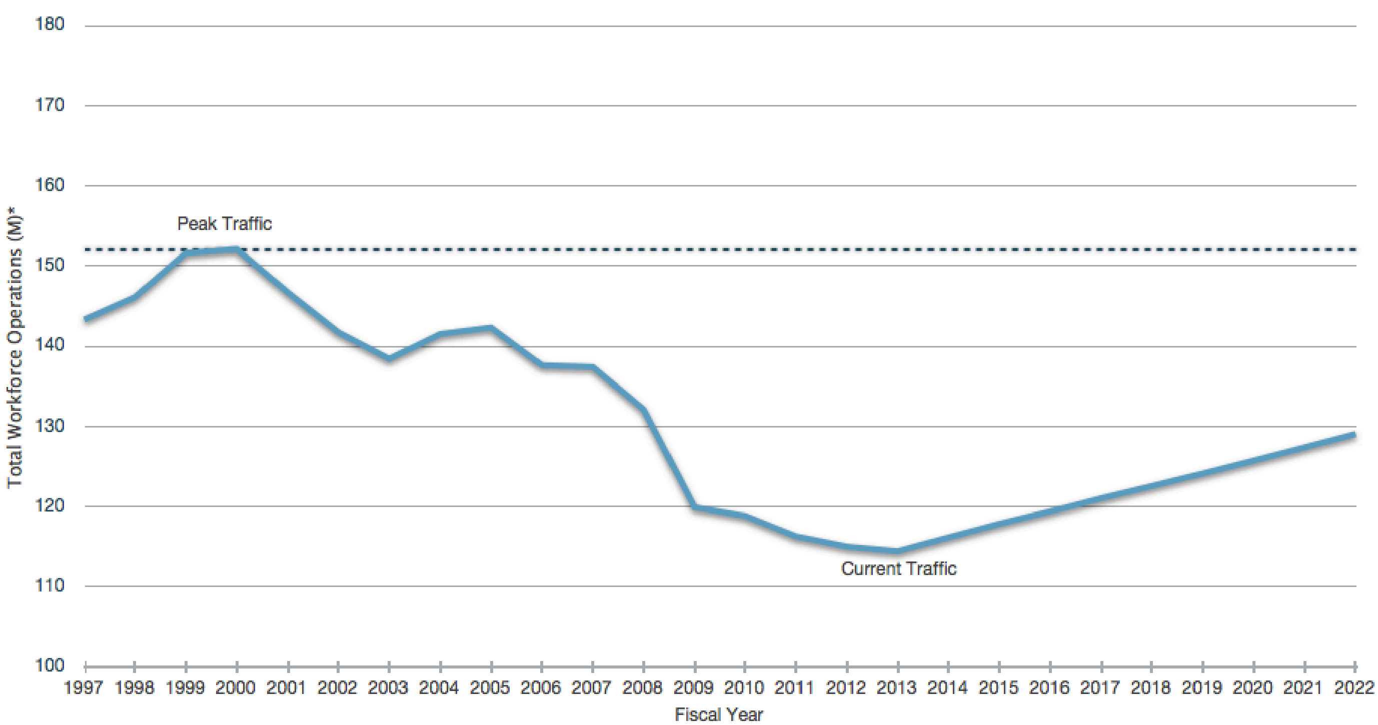
### Staffing to Traffic

Air traffic controller workload and traffic volume are dynamic, and so are the FAA's staffing needs. A primary factor affecting controller workload is the demand created by air traffic, encompassing both commercial and non-commercial activity. Commercial activity includes air carrier and commuter/air taxi traffic. Non-commercial activity includes general aviation and military traffic.

Adequate numbers of controllers must be available to cover the peaks in traffic caused by weather and daily, weekly or seasonal variations, so we continue to "staff to traffic." This practice gives us the flexibility throughout each day to match the number of controllers at each facility with traffic volume and workload.

System-wide, air traffic has declined by 24 percent since 2000. The chart in Figure 1.1 shows that air traffic volume is not expected to return to peak levels in the near term.

**Figure 1.1: Traffic Forecast**

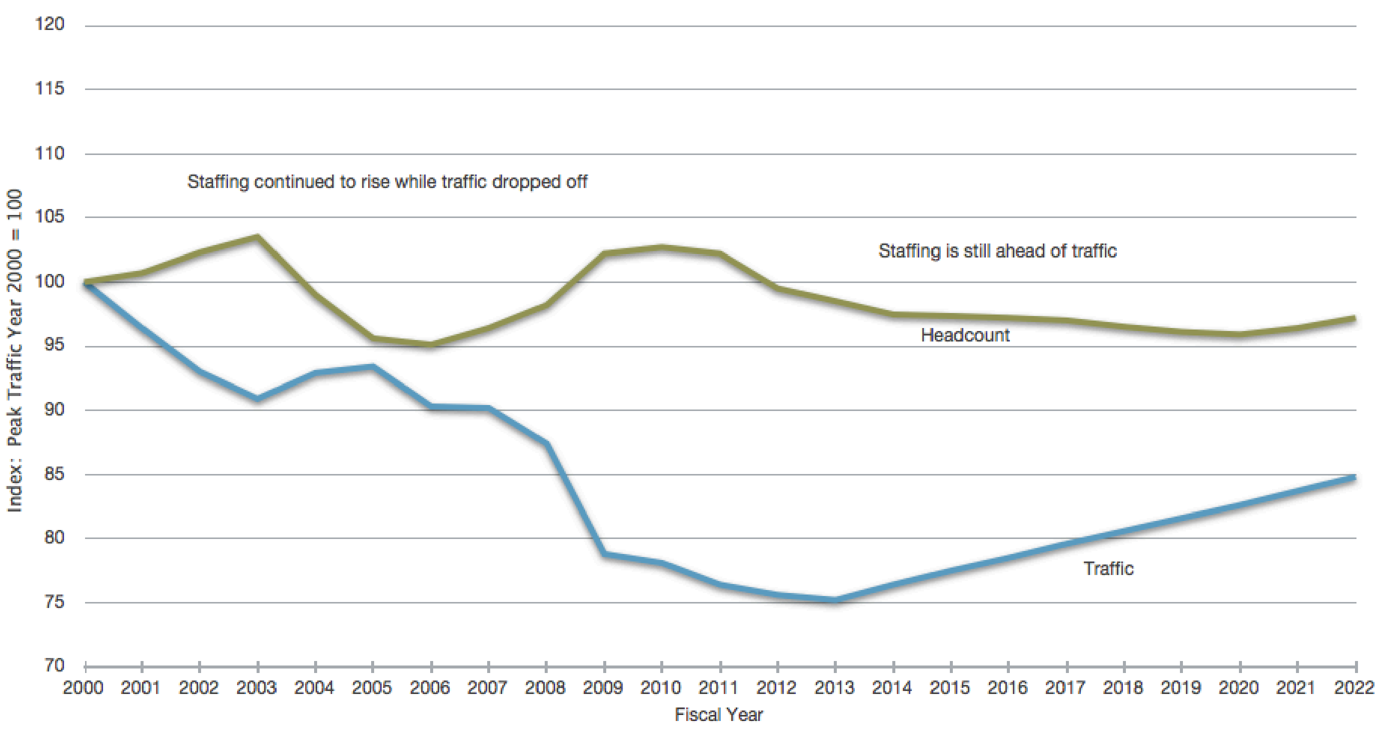



*Total Workforce Operations = Tower + TRACON + Aircraft Handled by En Route Centers

The chart below shows system-wide controller staffing and traffic, indexed from 2000 and projected through 2022. Indexing is a widely used technique which compares change over time of two or more data series (in this case, staffing and traffic). The data series are set equal to each other (or indexed) at a particular point in time (in this case, the year 2000, a recent high mark for traffic) and measured relative to that index point in each successive year. This way we know how much growth or decline has occurred compared to the base value.

Staffing to traffic not only applies on a daily basis, but also means that we staff to satisfy expected needs two to three years in advance. We do this to ensure sufficient training time for new hires. Despite the decline in air traffic shown in Figure 1.2, "staffing to traffic" requires us to anticipate controller attrition, so that we plan and hire new controllers in advance of need. The "bubble" caused by this advance-hire trainee wave is one reason that staffing remains well ahead of traffic.

**Figure 1.2: System-wide Traffic and Total Controller Trends**



## Meeting the Challenge

The FAA has demonstrated over the past several years it can handle the long-predicted wave of expected controller retirements. In the last five years, the FAA has hired 6,674 controllers. There were 2,883 retirements for the same period.

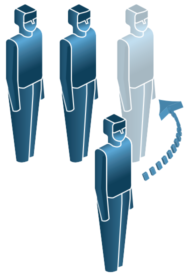
FAA hires in advance to reflect all attrition, not just retirements. The FAA's current hiring plan has been designed to phase in new hires as needed over time. This will avoid creating another major spike in retirement eligibility in future years like the current one resulting from the 1981 controller strike. We are now entering a steady-state period in which we expect new hires to mirror losses for the next several years.

Hiring, however, is just one part of the challenge. Other challenges involve controller placement, controller training and controller scheduling. It is important that newly hired and transferring controllers are properly placed in the facilities where we will need them. Once they are placed, they need to be effectively and efficiently trained, and assigned to efficient work schedules.

To address these challenges, the FAA:

- Convened an Independent Review Panel that focused on air traffic controller selection, assignment and training.
- Procured a commercially available off-the-shelf scheduling product that provides a common toolset for FAA facilities to effectively develop and maintain optimal schedules based on traffic, staffing, work rules and qualifications.

Effective and efficient training, properly placing new and transferring controllers, and efficient scheduling of controllers are all important factors in the agency's success.



Systematically replacing air traffic controllers where we need them, as well as ensuring the knowledge transfer required to maintain a safe NAS, is the focus of this plan.

# Chapter 2: Facilities and Services

## America's NAS is a network of people, procedures and equipment. Pilots, controllers, technicians, engineers, inspectors and supervisors work together to make sure millions of passengers move through the airspace safely every day.

More than 15,000 federal air traffic controllers in airport traffic control towers, Terminal radar approach control facilities and air route traffic control centers guide pilots through the system. An additional 1,375 civilian contract controllers and more than 9,500 military controllers also provide air traffic services for the NAS.

These controllers provide air navigation services to aircraft in domestic airspace, including 24.6 million square miles of international oceanic airspace delegated to the United States by the International Civil Aviation Organization.

### Terminal and En Route Air Traffic Services

Controller teams in airport towers and radar approach control facilities watch over all planes traveling through the Terminal airspace. Their main responsibility is to organize the flow of aircraft into and out of an airport. Relying on visual observation and radar, they closely monitor each plane to ensure a safe distance between all aircraft and to guide pilots during takeoff and landing. In addition, controllers keep pilots informed about changes in weather conditions.

Once airborne, the plane quickly departs the Terminal airspace surrounding the airport.

At this point, controllers in the radar approach control notify En Route controllers who take charge in the vast airspace between airports. There are 21 air route traffic control centers around the country. Each En Route center is assigned a block of airspace containing many defined routes. Airplanes fly along these designated routes to reach their destination.

En Route controllers use surveillance methods to maintain a safe distance between aircraft. En Route controllers also provide weather advisory and traffic information to aircraft under their control. As an aircraft nears its destination, En Route controllers transition it to the Terminal environment, where Terminal controllers guide it to a safe landing.

### FAA Air Traffic Control Facilities

As of October 1, 2012, the FAA operated 315 air traffic control facilities and the Air Traffic Control System Command Center in the United States. Table 2.1 lists the type and number of these FAA facilities. More than one type of facility may be collocated in the same building.

Each type of FAA facility has several classification levels based on numerous factors, including traffic volume, complexity and sustainability of traffic. To account for changes in traffic and the effect of investments that reduce complexity, as well as to compensate controllers that work the highest and most complex volume of traffic, facilities are monitored for downward and upward trends.

**Table 2.1** Types and Number of FAA Air Traffic Control Facilities

| Type | Name | Number of Facilities | Description |
|---|---|---|---|
| 1 | Tower without Radar | 1 | An airport traffic control terminal that provides service using direct observation primarily to aircraft operating under visual flight rules (VFR). This terminal is located at airports where the principal user category is low-performance aircraft. |
| 2 | Terminal Radar Approach Control (TRACON) | 23 | An air traffic control terminal that provides radar-control service to aircraft arriving or departing the primary airport and adjacent airports, and to aircraft transiting the terminal's airspace. |
| 3 | Combination Radar Approach Control and Tower with Radar | 131 | An air traffic control terminal that provides radar-control service to aircraft arriving or departing the primary airport and adjacent airports, and to aircraft transiting the terminal's airspace. This terminal is divided into two functional areas: radar approach control positions and tower positions. These two areas are located within the same facility, or in close proximity to one another, and controllers rotate between both areas. |
| 4 | Combination Non-Radar Approach Control and Tower without Radar | 2 | An air traffic control terminal that provides air traffic control services for the airport at which the tower is located and without the use of radar, approach and departure control services to aircraft operating under Instrument Flight Rules (IFR) to and from one or more adjacent airports. |
| 6 | Combined Control Facility | 4 | An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. |
| 7 | Tower with Radar | 129 | An airport traffic control terminal that provides traffic advisories, spacing, sequencing and separation services to VFR and IFR aircraft operating in the vicinity of the airport, using a combination of radar and direct observations. |
| 8 | Air Route Traffic Control Center (ARTCC) | 21 | An air traffic control facility that provides air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. |
| 9 | Combined TRACON Facility | 4 | An air traffic control terminal that provides radar approach control services for two or more large hub airports, as well as other satellite airports, where no single airport accounts for more than 60 percent of the total Combined TRACON facility's air traffic count. This terminal requires such a large number of radar control positions that it precludes the rotation of controllers through all positions. |
| — | Air Traffic Control System Command Center | 1 | The Air Traffic Control System Command Center is responsible for the strategic aspects of the NAS. The Command Center modifies traffic flow and rates when congestion, weather, equipment outages, runway closures or other operational conditions affect the NAS. |

# Chapter 3: Staffing Requirements

The FAA issued the first comprehensive controller workforce plan in December 2004. "A Plan for the Future: 10-Year Strategy for the Air Traffic Control Workforce" detailed the resources needed to keep the controller workforce sufficiently staffed. This report is updated each year to reflect changes in traffic forecasts, retirements and other factors.

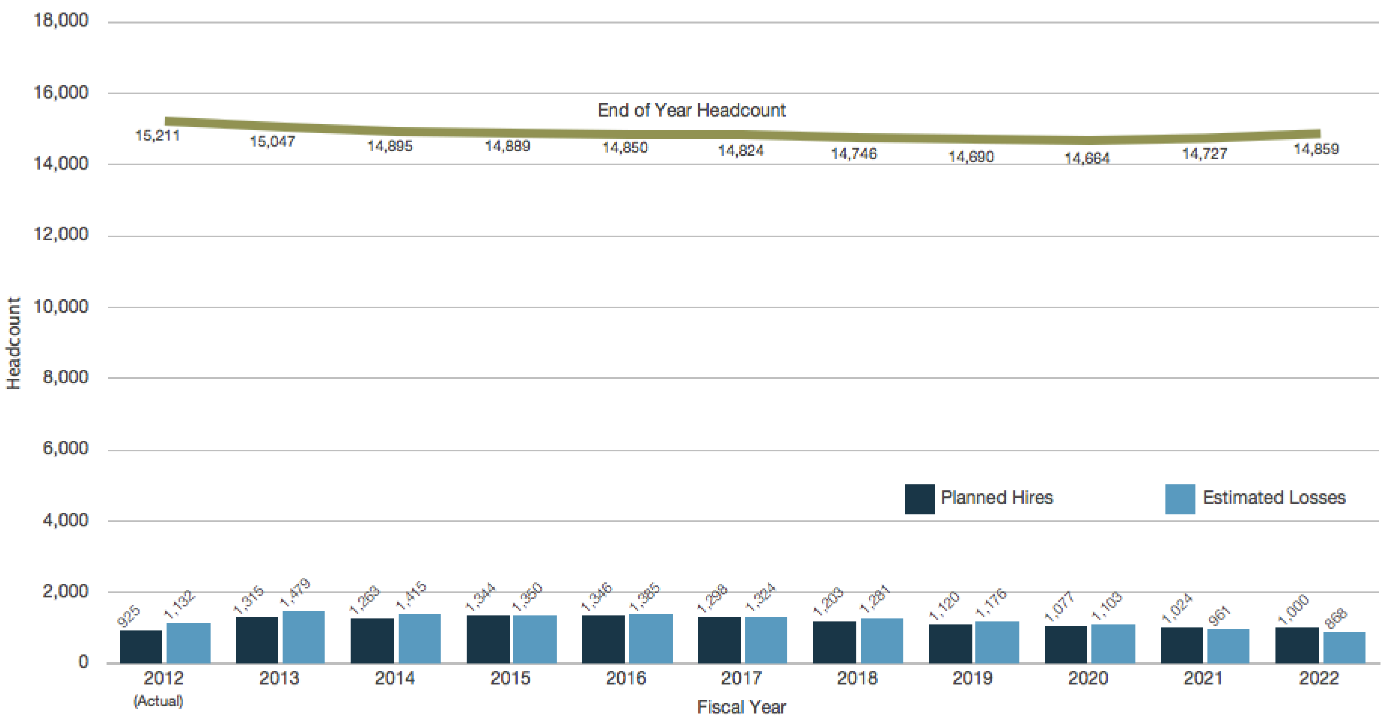
"Staffing to traffic" requires the FAA to consider many facility-specific factors. They include traffic volumes based on FAA forecasts and hours of operation, as well as individualized forecasts of controller retirements and other non-retirement losses. In addition, staffing at each location can be affected by unique facility requirements such as temporary airport runway construction, seasonal activity and the number of controllers currently in training. Staffing numbers will vary as the requirements of the location dictate.

Proper staffing levels also depend on the efficient scheduling of employees, so the FAA tracks a number of indicators as part of its continuous staffing review. Some of these indicators are overtime, time on position, leave usage and the number of trainees. For example, in FY 2012, the system average for overtime was 2.2 percent, a slight increase from the FY 2011 level.

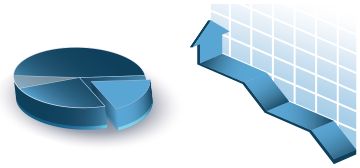
Figure 3.1 shows the expected end-of-year headcount, losses and new hires by year through FY 2022.

Figures for FY 2012 represent actual end-of-year headcount, losses and hires. Losses include retirements, promotions and transfers, resignations, removals, deaths, developmental attrition and academy attrition.

**Figure 3.1: Projected Controller Workforce Controller Trends**




Note: Annual hires and losses are a relatively small proportion of the total controller workforce. Forecast does not include the effects of sequestration.



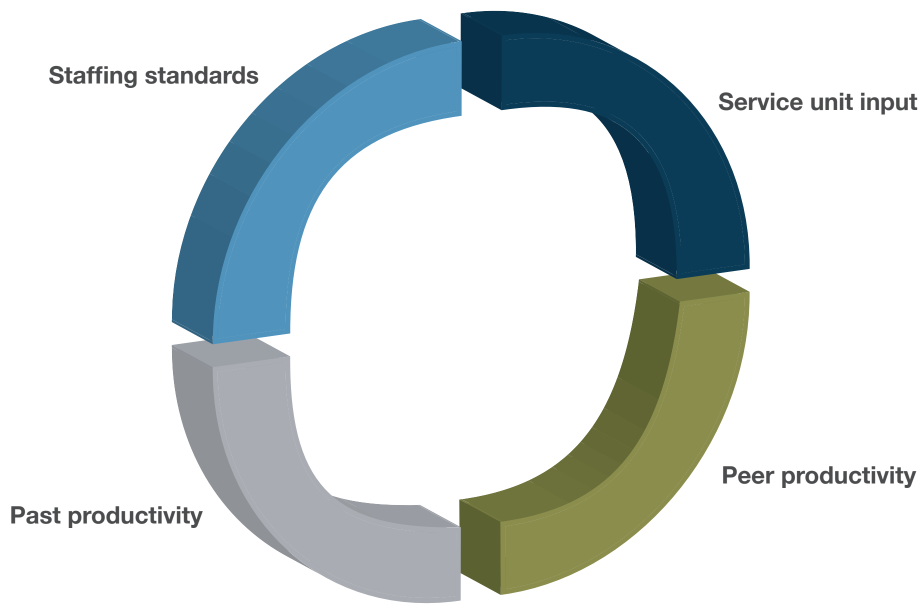
The FAA uses many metrics to manage its facilities.

## Staffing Ranges

Each of the FAA's 315 facilities typically staffs open positions with a combination of certified controllers who are proficient, or checked out, in specific sectors or positions. Because traffic and other factors are dynamic at these facilities, the FAA produces facility-level controller staffing ranges. These ranges are calculated to ensure that there are enough controllers to cover operating positions every day of the year.

Ensuring that we have enough controllers is not only important on a daily basis, but also means that we staff to satisfy expected needs two to three years in advance. We do this to ensure sufficient training time for new hires. The "bubble" caused by hiring two to three years ahead of time is one reason that staffing remains well ahead of traffic.

The FAA uses four data sources to calculate staffing ranges. Three are data driven, the other is based on field judgment. They are:




1. Staffing standards — mathematical models used to relate controller workload and air traffic activity.

2. Service unit input —the number of controllers required to staff the facility, typically based on past position utilization and other unique facility operational requirements. The service unit input is validated by field management.

3. Past productivity — the headcount required to match the historical best productivity for the facility. Productivity is defined as operations per controller. Facility productivity is calculated using operations and controller data from the years 2000 to 2012. If any annual point falls outside +/- 5 percent of the 2000 to 2012 average, it is thrown out. From the remaining data points, the highest productivity year is then used.

4. Peer productivity — the headcount required to match peer group productivity. Like facilities are grouped by type and level and their corresponding productivity is calculated. If the facility being considered is consistently above or below the peer group, the peer group figure is not used in the overall average and analysis.

The average of this data is calculated, rounded to the nearest whole number, multiplied by +/- 10 percent and then rounded again to determine the high and low points in the staffing range.

Exceptional situations, or outliers, are removed from the averages (for example, if a change in the type or level of a facility occurred over the period of evaluation). By analyzing the remaining data points, staffing ranges are generated for each facility.

The 2013 staffing ranges for certified controllers are published by facility in the Appendixes of this report. In many facilities, the current Actual on Board (AOB) number may exceed the range. This is because many facilities' current AOB (all controllers at the facility) numbers include larger numbers of developmental controllers in training to offset expected future attrition. Individual facilities can be above the range due to advance hiring. Facilities may also be above the range based upon facility-specific training and attrition forecasts.

In the longer term, the number of new hires and total controllers will decline as the current wave of developmental controllers become certified professional controllers (CPC), and the long-expected retirement wave has passed. At that point, the vast majority of the controllers will be CPCs and certified professional controllers in training (CPC-IT), and more facilities will routinely fall within the ranges.

**Figure 3.2: Controller Staffing Range**

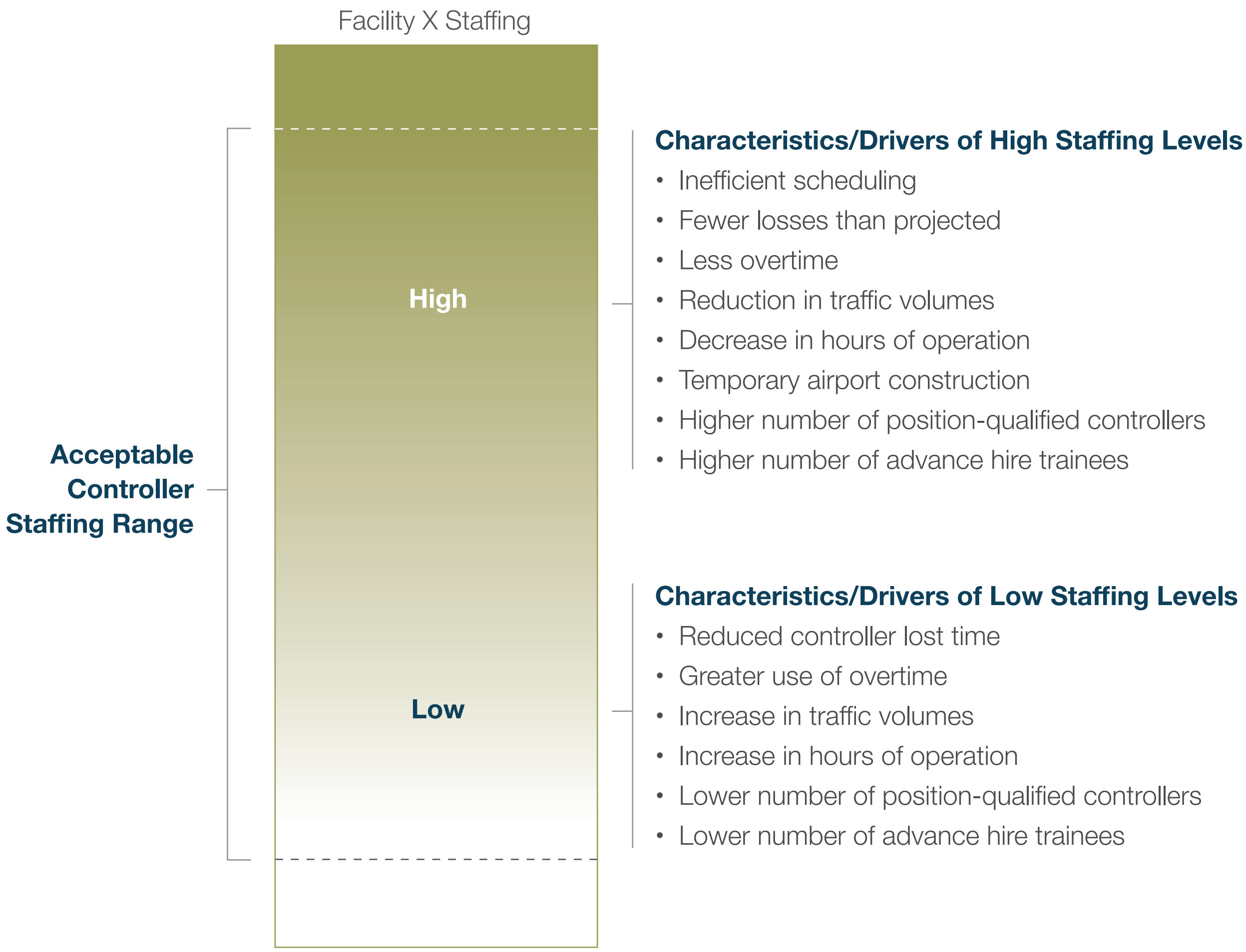


Figure 3.3 depicts an example of a large, Type 3 FAA facility. This Combination Radar Approach Control and Tower with Radar facility is one in which controllers work in the tower cab portion and in the radar room (also known as a TRACON). To be a CPC in these types of facilities, controllers must be checked out on all positions in both the tower and the TRACON.

Trainees are awarded “D1” status (and the corresponding increase in pay) after being checked out on several positions. The levels of responsibility (and pay) gradually increase as trainees progress through training.

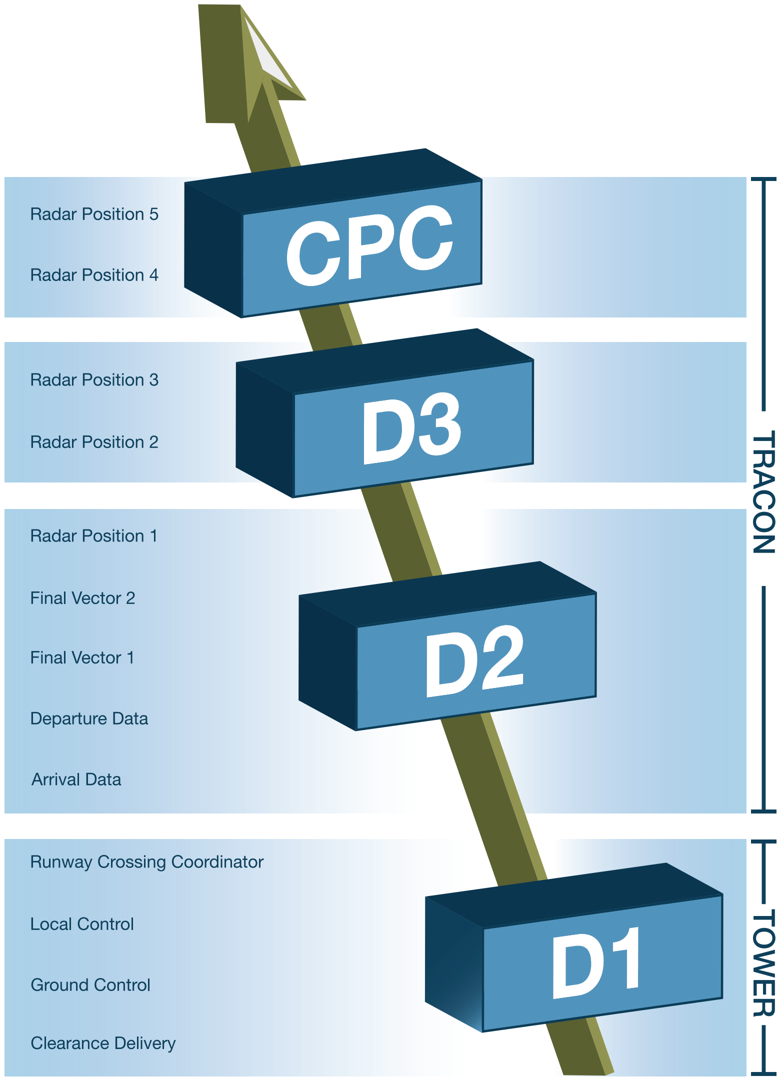
Once developmental controllers are checked out at the D1 level, they can work several positions in the tower (Clearance Delivery, Ground Control and Local Control). Once checked out on the Runway Crossing Coordinator position, the developmental controller would be considered tower certified, but still not a CPC, as CPCs in this type of facility must also be certified on positions in the radar room.

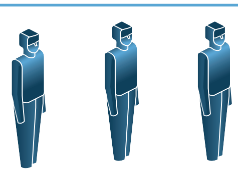
The levels of responsibility continue to increase as one progresses toward CPC status, but trainees can and do control traffic much earlier in the training process. Historically, the FAA has used these position-qualified controllers to staff operations and free up CPCs for more complex positions as well as to conduct training.

Having the majority of the workforce checked out as CPCs makes the job of scheduling much easier at the facility. CPCs can cover all positions in their assigned area, while position-qualified developmentals require the manager to track who is qualified to work which positions independently. This task will be easier once the FAA’s operational planning and scheduling (OPAS) tool is fully implemented.

The FAA hires and staffs facilities so that trainees are fully prepared to take over responsibilities when senior controllers retire.

**Figure 3.3: Controller Training Progression**



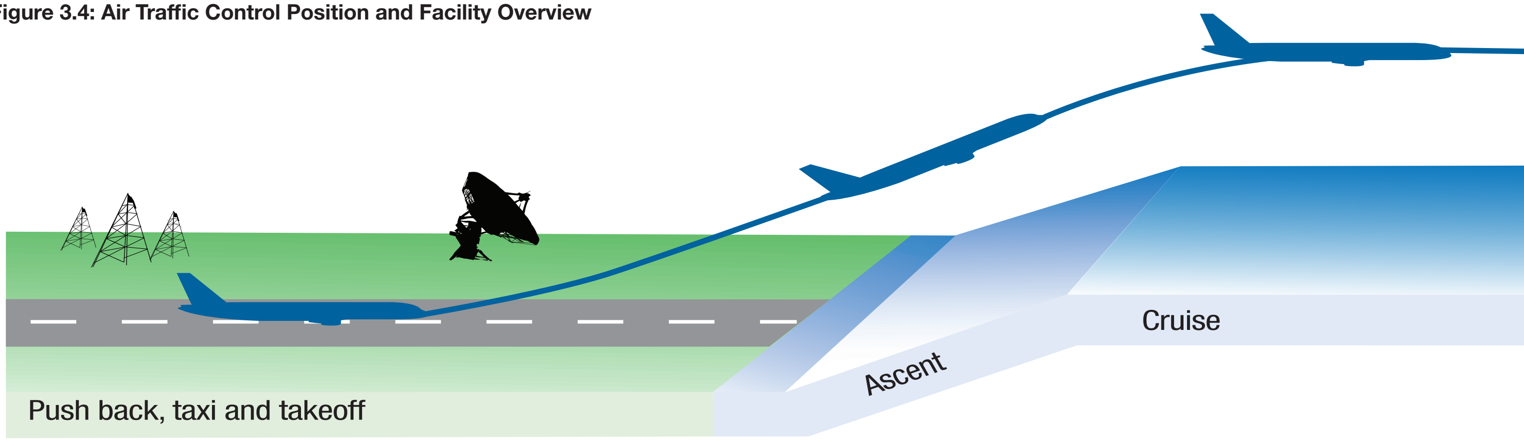
Trainees are defined as the number of developmental and certified professional controllers in training.

## Air Traffic Staffing Standards Overview

The FAA has used air traffic staffing standards to help determine controller staffing levels since the 1970s.

FAA facilities are currently identified and managed as either Terminal facilities where airport traffic control services are provided, including the immediate airspace around an airport, or En Route facilities where high altitude separation services are provided using computer systems and surveillance technologies. Terminal facilities are further designated as tower cabs or TRACONs. These Terminal facilities may be collocated in the same building, but because of differences in workload, their staffing requirements are modeled separately.

**Figure 3.4: Air Traffic Control Position and Facility Overview**




### Airport Traffic Control Tower (ATCT)

**Ground Controller**

Issues approval for push back from gate and issues taxi instructions and clearances.

**Local Controller**

Issues takeoff clearances, maintains prescribed separation between departure aircraft, provides departure aircraft with latest weather/field conditions.

**Clearance Delivery**

Issues IFR and VFR flight plan clearances.

**Flight Data**

Receives and relays weather information and Notice to Airmen.

### Terminal Radar Approach Control (TRACON)

**Departure Controller**

Assigns headings and altitudes to departure aircraft. Hands off aircraft to the En Route Radar Controller.

**Flight Data - Radar**

Issues IFR flight plan clearances to aircraft at satellite airports, coordinates releases of satellite departures.

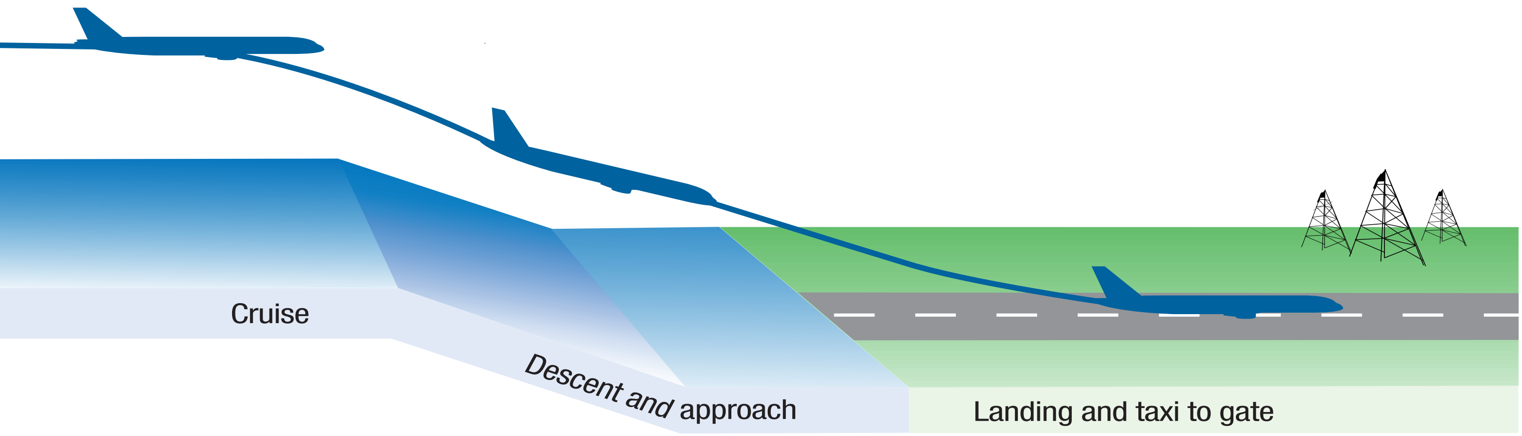
### Air Route Traffic Control Center (ARTCC)

**Radar Controller**

Ensures the safe separation and orderly flow of aircraft through En Route center airspace (includes oceanic airspace).

**Radar Associate**

Assists the Radar Controller.




### Air Route Traffic Control Center (ARTCC)

**Radar Associate (Flight Data)**

Supports the Center Radar Controller by handling flight data.

### Terminal Radar Approach Control (TRACON)

**Arrival Controller**

Assigns headings and altitudes to arrival aircraft to establish aircraft on final approach course.

### Airport Traffic Control Tower (ATCT)

**Local Controller**

Issues landing clearances, maintains prescribed separation between arrivals, provides arrival aircraft with latest weather/field conditions.

**Ground Controller**

Issues taxi instructions and clearances to guide aircraft to the gate.

# Chapter 3: Staffing Requirements

The dynamic nature of air traffic controller workload coupled with traffic volume and facility staffing needs are all taken into account during the development of FAA staffing standards and models.

All FAA staffing models incorporate similar elements:

- Controller activity data is collected and processed quarterly, commensurate with the type of work being performed in the facilities.
- Models are developed that relate controller workload to air traffic activity. These requirements are entered into a scheduling algorithm.
- The modeled workload/traffic activity relationship is forecasted for the 90th percentile (or 37th busiest) day for future years for each facility. Staffing based on the demands for the 90th percentile day assures that there are adequate numbers of controllers to meet traffic demands throughout the year.
- Allowances are applied for off-position activities such as vacation, training, and additional supporting activities that must be accomplished off the control floor, such as performance management discussions, training team discussions, and other activities to enhance workplace operations.

In 2005, the FAA began an air traffic staffing standard review and assessment with the expectation of developing staffing ranges at the facility level. In 2007, the FAA revised the standards models for towers and En Route centers and, in 2009, completed revised standards models for TRACON facilities.

The FAA incorporated recommendations found in the Transportation Research Board special report “Air Traffic Control Facilities, Improving Methods to Determine Staffing Requirements.” These recommendations included significantly expanding the amount of input data and improving the techniques used to develop the standards.

All staffing models went through similar development processes. Some components of the model-development phase varied as a function of the work being performed by the controllers. For example, a crew-based approach was used to model tower staffing requirements because the number and type of positions in a tower cab vary considerably as traffic changes, compared to those of a single sector in a TRACON or En Route center. All staffing models reflect the dynamic nature of staffing and traffic. Controller staffing requirements can vary throughout the day and throughout the year.

### Tower Cab Overview

Air traffic controllers working in tower cabs manage traffic within a radius of a few miles of the airport. They instruct pilots during taxiing, takeoff and landing, and they grant clearance for aircraft to fly. Tower controllers ensure that aircraft maintain minimum separation distances between landing and departing aircraft, transfer control of aircraft to TRACON controllers when the aircraft leave their airspace, and receive control of aircraft for flights coming into their airspace.

- There are a variety of positions in the tower cab, such as Local Control, Ground Control, Flight Data, Coordinator, etc. Depending on the airport layout and/or size of the tower cabs (some airports have more than one tower), there can be more than one of the same types of position on duty.

- As traffic, workload and complexity increase, more or different positions are opened; as traffic, workload and complexity decrease, positions are closed or combined with other positions.

Important factors that surfaced during the tower staffing model development included the availability, accessibility and increased reliability of traffic data and controller on-position reporting systems. The FAA is now able to analyze much larger quantities of tower data at a level of granularity previously unattainable. Staffing data and traffic volumes are collected for every facility.

The revised tower cab standards were developed using regression analysis as the primary method for modeling the relationship between staffing and workload drivers. The models relate observed, on-position controllers to the type and amount of traffic they actually handle. Regression analysis allows us to relate modeled controller staffing requirements with traffic activity and then use this relationship to predict future staffing requirements (standards) based on traffic projections.

### TRACON Overview

Air traffic controllers working in TRACONs typically manage traffic within a 40-mile radius of the primary airport; however, this radius varies by facility. They instruct departing and arriving flights, and they grant clearance for aircraft to fly through the TRACON's airspace. TRACON controllers ensure that aircraft maintain minimum separation distances between landing and departing aircraft, transfer control of aircraft to tower or En Route center controllers when the aircraft leave their airspace, and receive control of aircraft for flights coming into their airspace.

- TRACON airspace is divided into sectors that often provide services to multiple airports. Consolidated or large TRACONs in major metropolitan areas provide service to several primary airports. Their airspace is divided into areas of specialization, each of which contains groups of sectors.

- Controllers are assigned to various positions such as Radar, Final Vector, Departure Data, etc., to work traffic within each sector. These positions may be combined or de-combined based on changes in air traffic operations.

- As traffic, workload and complexity increase, the sectors may be subdivided (de-combined) and additional positions opened, or the sector sizes can be maintained with an additional controller assigned to an assistant position within the same sector.

- Similarly, when traffic, workload and complexity decline, the additional positions can be closed or the sectors recombined.

Like the tower analysis, the FAA is able to analyze much larger quantities of TRACON data at a level of granularity previously unattainable. Important factors surfaced during the TRACON staffing model review including the availability, accessibility and increased reliability of traffic data and controller on-position reporting systems. Staffing data and traffic volumes were collected for every facility.

The TRACON standards models were updated in early 2009. The revised TRACON standards were developed using regression analysis as the primary method for modeling the relationship between staffing and workload drivers. The models relate observed, on-position controllers to the type and amount of traffic they actually handled. Regression allows us to relate modeled controller staffing requirements with traffic activity and then use this relationship to predict future staffing requirements (standards) based on traffic projections.

# Chapter 3: Staffing Requirements

## En Route Overview

Air traffic controllers assigned to En Route centers guide airplanes flying outside of Terminal airspace. They also provide approach control services to small airports around the country where no Terminal service is provided. As aircraft fly across the country, pilots talk to controllers in successive En Route centers.

- En Route center airspace is divided into smaller, more manageable blocks of airspace called areas and sectors.
- Areas are distinct, and rarely change based on changes in traffic. Within those areas, sectors may be combined or de-combined based on changes in air traffic operations.
- Controllers are assigned to positions within the sectors (e.g., Radar, Radar Associate, Tracker). As traffic increases, sectors can be de-combined and additional positions opened, or the sector sizes can be maintained but additional controllers added to assistant positions within the sectors.
- Similarly, when traffic declines, the additional positions can be closed or the sectors recombined.

The FAA's Federally Funded Research and Development Center, operated by the MITRE Corporation, developed a model to generate data needed for the FAA's staffing models. Like the tower and TRACON standards models, this approach incorporated actual traffic and more facility-specific data.

MITRE's modeling approach reflects the dynamic nature of the traffic characteristics in a sector. It estimates the number of controllers, in teams of one to three people, necessary to work the traffic for that sector in 15-minute intervals. Differences in traffic characteristics in a sector could require different numbers of controllers to handle the same volume of traffic. For example, at one time most traffic might be cruising through a sector toward another location requiring minimal controller intervention. At another time, traffic might be climbing and descending through the same sector, a more complex scenario requiring more controllers. The same modeling techniques were applied uniformly to all sectors, providing results based on a common methodology across the country.

The FAA's staffing models incorporate the input data provided by MITRE, run it through a shift scheduling algorithm, apply traffic growth forecasts, and then apply factors to cover vacation time, break time, training, etc., to provide the staffing ranges presented in this plan for each En Route center.

In September 2010 the National Academy of Sciences completed a review at the FAA's request of MITRE's workload modeling capabilities. The review "concludes that the model is superior to past models because it takes into account traffic complexity when estimating task load. It recommends obtaining more operational and experimental data on task performance, however, to establish and validate many key model assumptions, relationships and parameters." The FAA continues its work with MITRE to address the National Academy of Sciences recommendations, while remaining cognizant of the current tight fiscal environment.

## Operational Planning and Scheduling (OPAS), formerly known as Resource Management Tool (RMT)

Optimizing controller schedules is a critical aspect of efficient workforce planning, since inefficient facility schedules can lead to excess staffing and/or increased overtime. Currently, the FAA's air traffic facilities do not have access to a standardized, automated tool to assist them in developing optimal schedules and analyzing long-term workforce planning requirements. FAA facilities currently use a variety of non-standard methods that do not fully incorporate the complex resource management requirements that exist in today's environment.

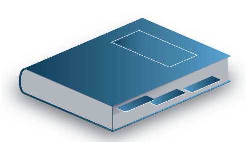
To address this need, the FAA has procured a commercially available "off-the-shelf" system that has been configured to FAA-specific requirements (e.g., national labor contract terms, FAA policy, etc.). The FAA's operational planning and scheduling (OPAS) tool will provide a common toolset for FAA facilities to effectively develop and maintain optimal schedules based on traffic, staffing, work rules and employee qualifications. Similar systems are being used by air navigation service providers worldwide and are commonplace in best-practice companies.

More specifically, OPAS will be used to create and analyze optimized schedules over variable blocks of time, with viewing capability in days, weeks, months, years or seasons. The system is able to:

- Generate optimal schedules for a given period of time (day, month, year) based on demand, business rule constraints, employee qualification requirements and available resources.
- Calculate optimal shift start times and length in support of national and local bargaining evaluations.
- Distribute employees across various shifts in the most efficient way.
- Calculate projected time on position (signed on and controlling traffic) to staff an area by shift, line and/or person.
- Run what-if analyses.
- Recommend optimal utilization of overtime and other time outside shift.
- Automate shift requests, bid process and other scheduling-related tasks.

The major functionalities in the OPAS application are split into long-term (typically yearly), short-term, and day-of operations. A typical workflow (from top-to-bottom and left-to-right) is shown below:

**Long-term**

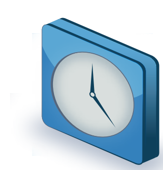


- Staff to traffic demand
- Bidding
- Efficient start times and shifts

**Short-term**


- Schedule generation and management

**Day-of**

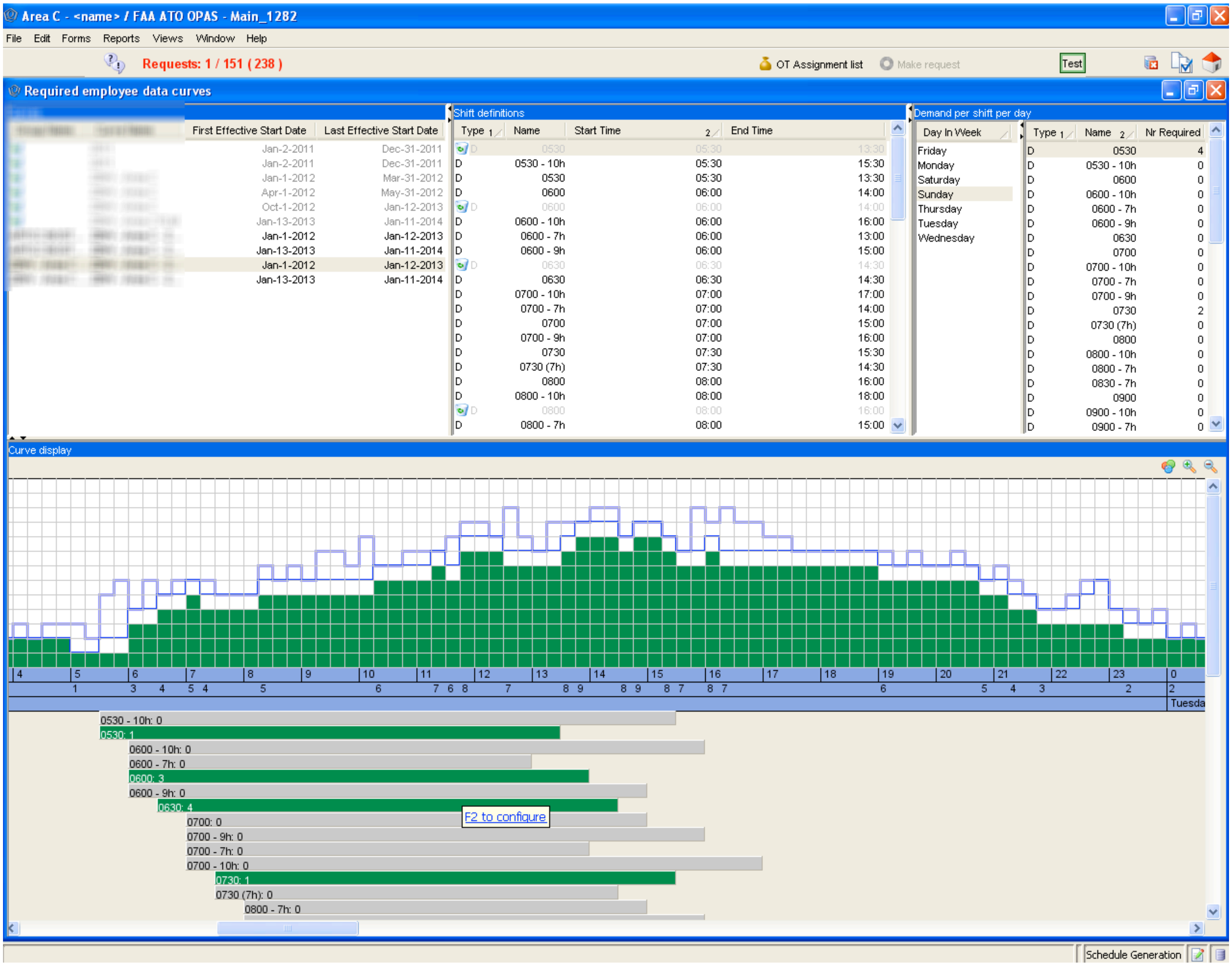


- Schedule management
- Managing short-term employee requests

### Specify Demand

OPAS forecasts demand (or number of CPCs required per 15-minute interval) for the entire year in a series of one-week periods. For example, one week of demand may describe the period from January to February and another the period from February to May, etc. If the summer is a particularly busy time, then there may be two separate demand periods, one for the summer and one for the winter. The application translates these demand periods into the set of start times and minimum number of shifts that are required (per day) in order to cover the demand. This minimum number helps determine whether it is possible to approve leave or move someone from an evening shift to a day shift.

**Figure 3.5: OPAS Demand Forecast and Shift Lines**



## Manage a Schedule/Day of Operation Views

Other views drill down to show the details of a single day. They allow the user to get a quick overview of what is happening on a given day, including leave, overtime, briefing periods and other duties (like ERAM training or special assignments).

The views can also address questions such as:

- "Who is working today and when?"
- "Who is working overtime?"
- "Who has a leave request for today, pending or approved?"

## OPAS Lite

OPAS Lite is a mobile Web application developed to provide access to many of the major functions within OPAS. It is accessible on all modern browsers and allows users to view and interact with the schedule anywhere, anytime. Functionality in OPAS Lite also includes a desktop kiosk (view-only mode), quick changing of users, viewing schedules, submitting requests and proxy requests, and viewing and acting on requests.

**Figure 3.6: Operational Planning and Scheduling Lite**

## Technological Advances

The Next Generation Air Transportation System (NextGen) is taking shape. Recent efforts to expand the use of Performance Based Navigation are already paying off in fuel savings and increased capacity in key parts of the National Airspace System (NAS). Infrastructure that was committed to in recent years, including Automatic Dependent Surveillance-Broadcast (ADS-B) and the modernization of major automation systems, is being deployed and creating the tangible foundation for NextGen. And the FAA continues to mature the next wave of NextGen capabilities, including Data Communications, the next generation of voice switches and new concepts for weather management.

These investments, over time, are expected to drive substantial benefits for the FAA and its stakeholders. For air carriers, NextGen aims to create a more predictable, efficient environment that saves their customers time and allows for better decision-making about resources, including crew scheduling and fuel usage. For the FAA, NextGen should lead to a range of benefits, including increased productivity from a workforce using a full suite of modern tools.

This increased productivity, and its ultimate impact on the size and composition of the FAA's workforce, depends on many factors. Over time, the relationship between pilots and air traffic controllers will evolve. The relationship between controller, and automated systems will similarly evolve. These evolutions will occur gradually and require much testing and analysis to ensure the safety of the system.

While the staffing projections in this workforce plan are based on the current concept of operations for air traffic control, the FAA's En Route staffing models are incorporating data captured from centers that have switched from the computer and backup system to ERAM (En Route Automation Modernization). ERAM is the new automation platform for the centers, which control high-altitude traffic and replaces the 40-year-old En Route system used nationwide.

ERAM technology is the heart of NextGen and the pulse of the NAS. It is helping to advance our transition from a ground-based system of air traffic control to a satellite-based system of air traffic management. ERAM technology processes flight radar data, provides communications and generates display data for air traffic controllers.

In the future, ERAM will increase capacity and improve efficiency in our skies. En Route controllers will have the capability to track more aircraft at a time. Additionally, coverage will extend beyond facility boundaries, enabling controllers to handle traffic more efficiently.

# Chapter 4: Losses

## In total, the FAA expects to lose over 1,400 controllers due to retirements, promotions and other losses this fiscal year. Other controller losses include transfers, resignations, removals, deaths, developmental attrition and academy attrition.

Fiscal year 2012 attrition came in at 1,132 losses, representing 99.4 percent accuracy with the forecast of 1,139 losses. We have incorporated this updated attrition into our forecasts.

The FAA hires and staff facilities so that trainees are fully prepared to take over responsibilities when senior controllers retire.

### Controller Loss Summary

Table 4.1 shows the total estimated number of controllers that will be lost, by category, over the period FY 2013 through FY 2022.

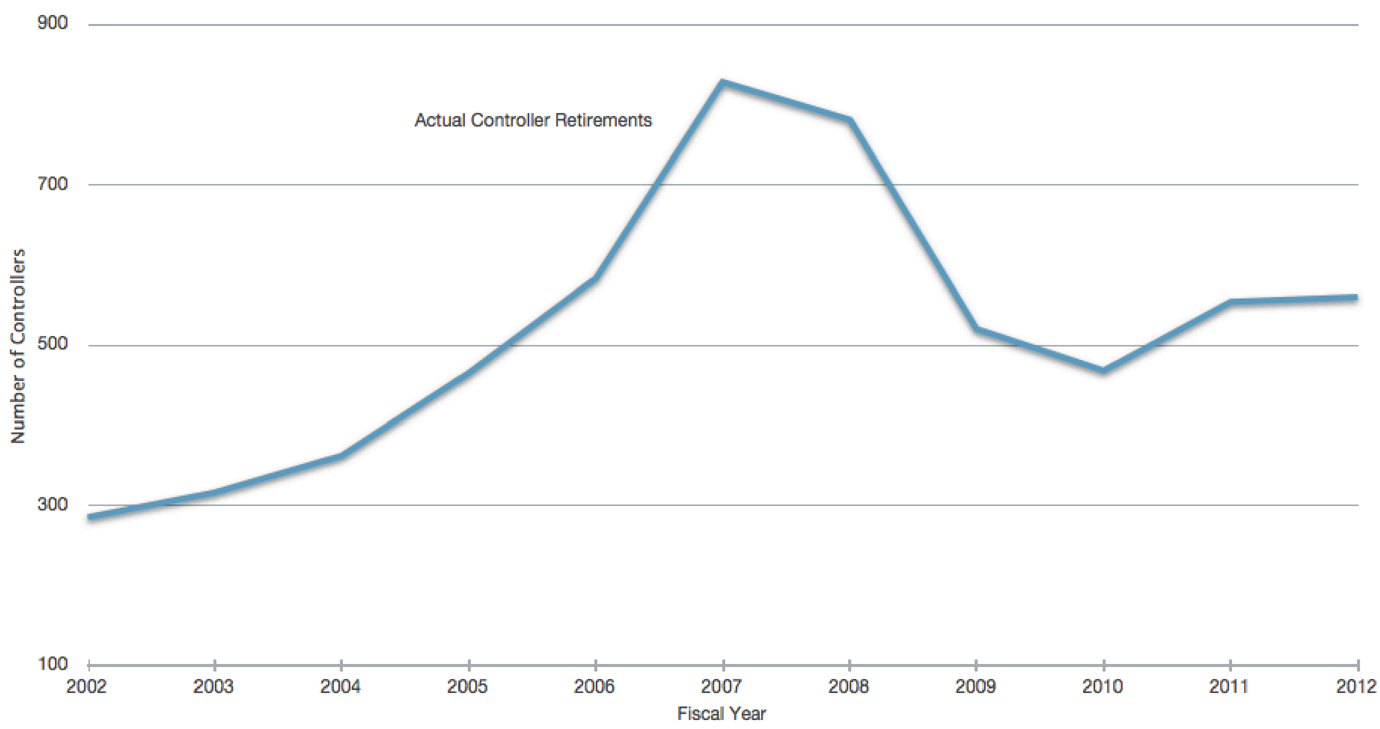
**Table 4.1 Controller Loss Summary**

| Loss Category | Losses: 2013 – 2022 |
|---|---|
| Retirements | 5,476 |
| Resignations, Removals and Deaths | 487 |
| Developmental Attrition | 1,139 |
| Promotions/Transfers | 3,598 |
| Academy Attrition | 1,642 |
| **Total** | **12,342** |

## Actual Controller Retirements

Fiscal year 2007 was correctly projected to be a peak year for retirements of controllers hired in the early 1980s.

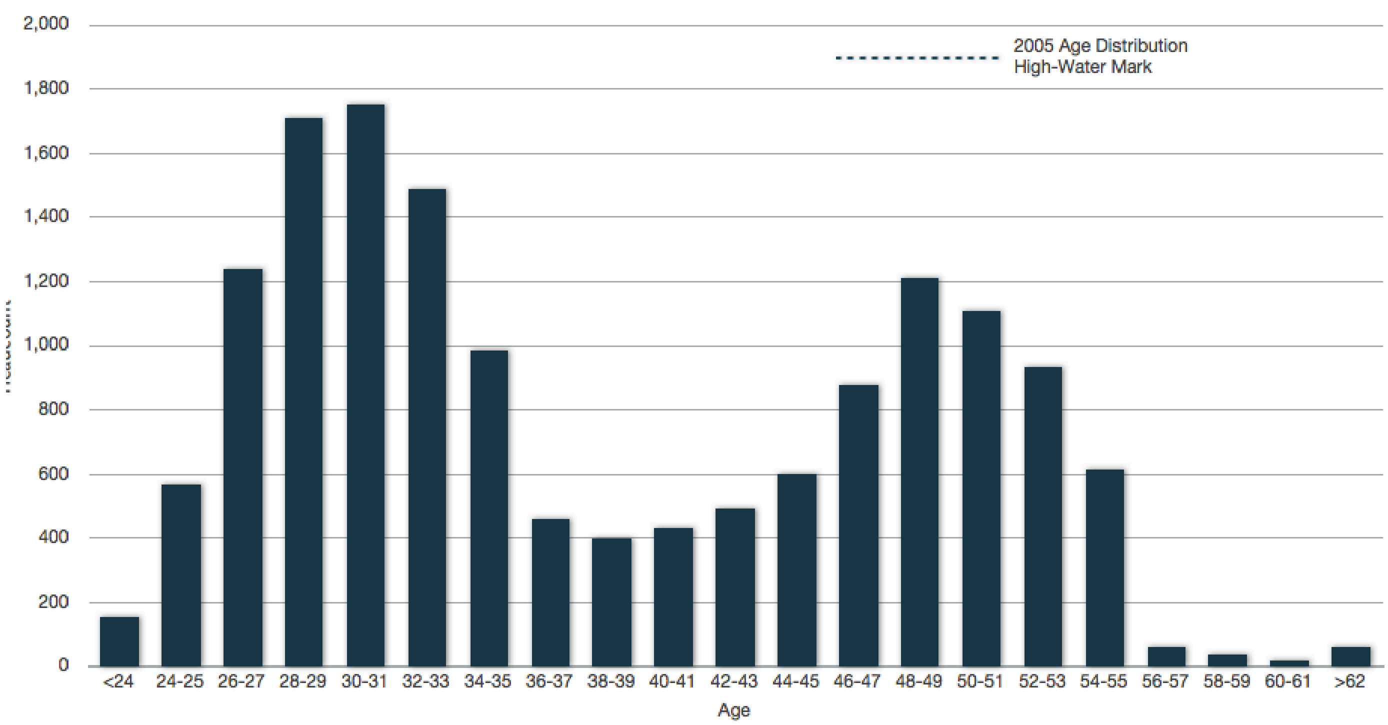
**Figure 4.1: Actual Controller Retirements**



### Controller Workforce Age Distribution

The agency hired a substantial number of controllers in the years immediately following the 1981 strike. This concentrated hiring wave meant a large portion of the controller workforce would reach retirement age in roughly the same time period. In September 2005, the age distribution peak on the right side of Figure 4.2 was greater than 1,900 controllers. Today, the magnitude of that remaining peak is down to about 1,200 controllers.

**Figure 4.2: Controller Workforce Age Distribution as of September 22, 2012**




> Today's hiring plans are designed to gradually phase in new hires as needed. This will also spread out the retirement eligibility of the current wave of new hires and reduce the magnitude of the retirement eligibility peak in future years.

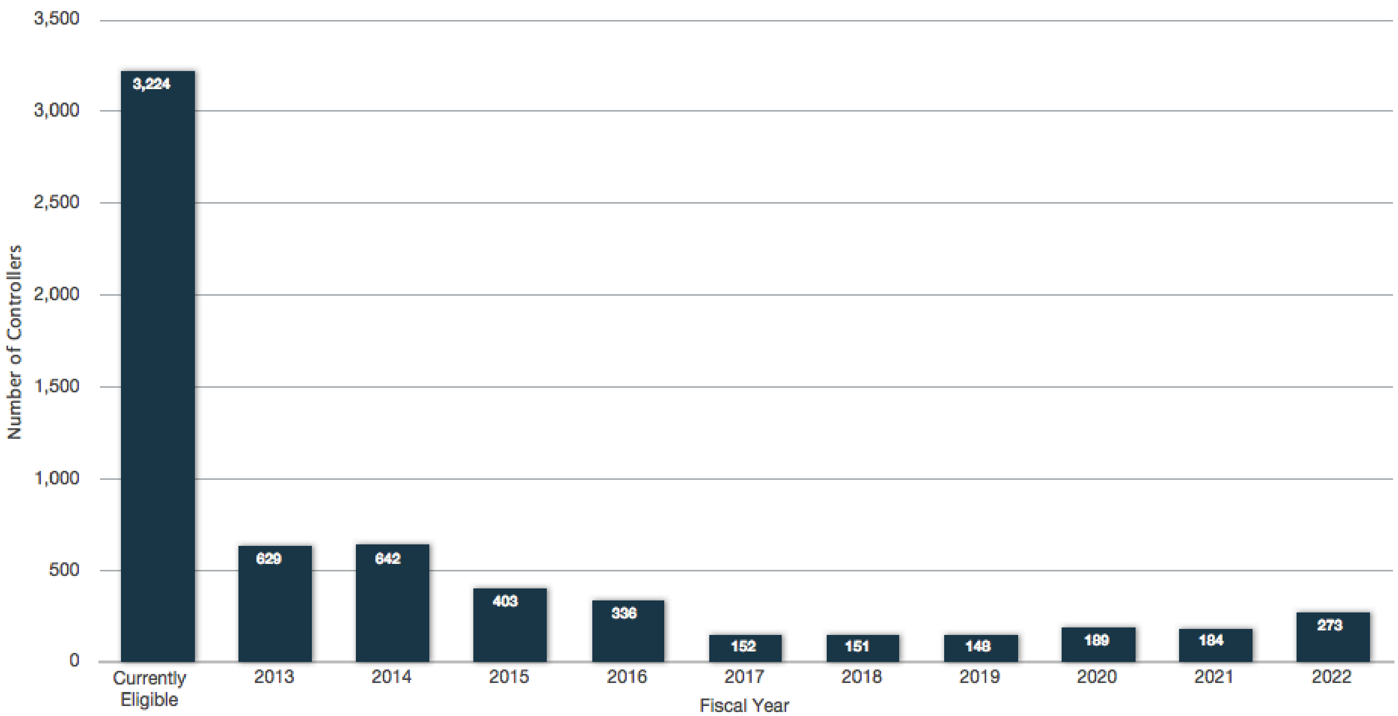
## Controller Retirement Eligibility

In addition to normal civil service retirement criteria, controllers can become eligible under special retirement criteria for air traffic controllers (age 50 with 20 years of "good time" service or any age with 25 years "good time" service). "Good time" is defined as service in a covered position, as defined in Public Law 92-297. Under Public Law 92-297, air traffic controllers are usually required to retire at age 56.

After computing eligibility dates using all criteria, the FAA assigns the earliest of the dates as the eligibility date. Eligibility dates are then aggregated into classes based on the fiscal year in which eligibility occurs.

Figure 4.3 shows the number of controllers who are currently retirement eligible as of September 2012 and those projected to become retirement eligible each fiscal year through FY 2022. Agency projections show that an additional 629 controllers will become eligible to retire in FY 2013.

**Figure 4.3: Retirement Eligibility**



### Controller Retirement Pattern

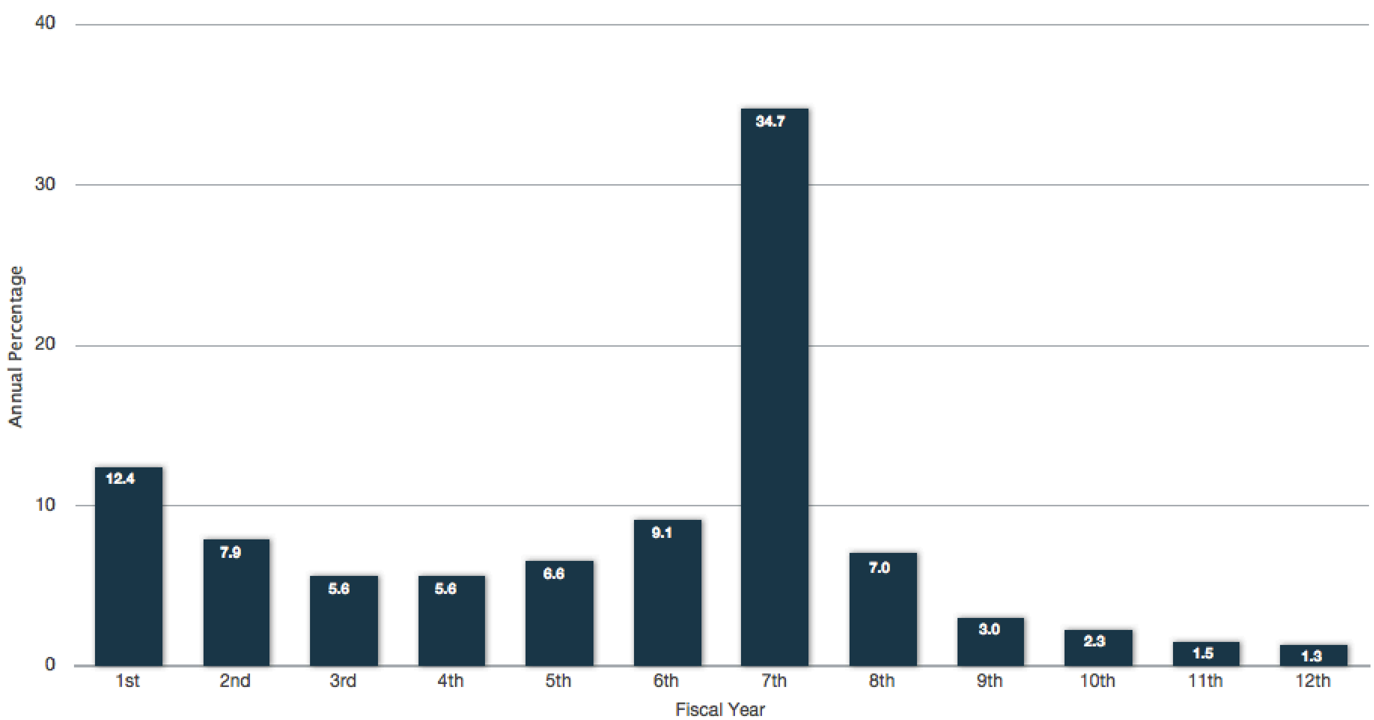
History shows that not all controllers retire when they first become eligible. In 2012, only 12.4 percent of controllers who first became eligible actually retired. This is down slightly from 13 percent in the previous year's plan.

Since the economic downturn began in 2008, the FAA has observed that many controllers are delaying retirement until they get closer to the mandatory retirement age of 56. Because most controllers first become retirement eligible at age 50, they typically reach mandatory retirement age in their seventh year of eligibility.

These trends are seen in Figure 4.4 below, which shows fewer controllers are retiring earlier in their eligibility and are waiting until closer to their mandatory retirement age.

Despite the increased likelihood of delayed retirement, the majority of controllers still leave the controller workforce prior to reaching the mandatory age.

**Figure 4.4: Percent of Controllers Retiring in the Nth Fiscal Year of Their Eligibility**



## Controller Losses Due to Retirements

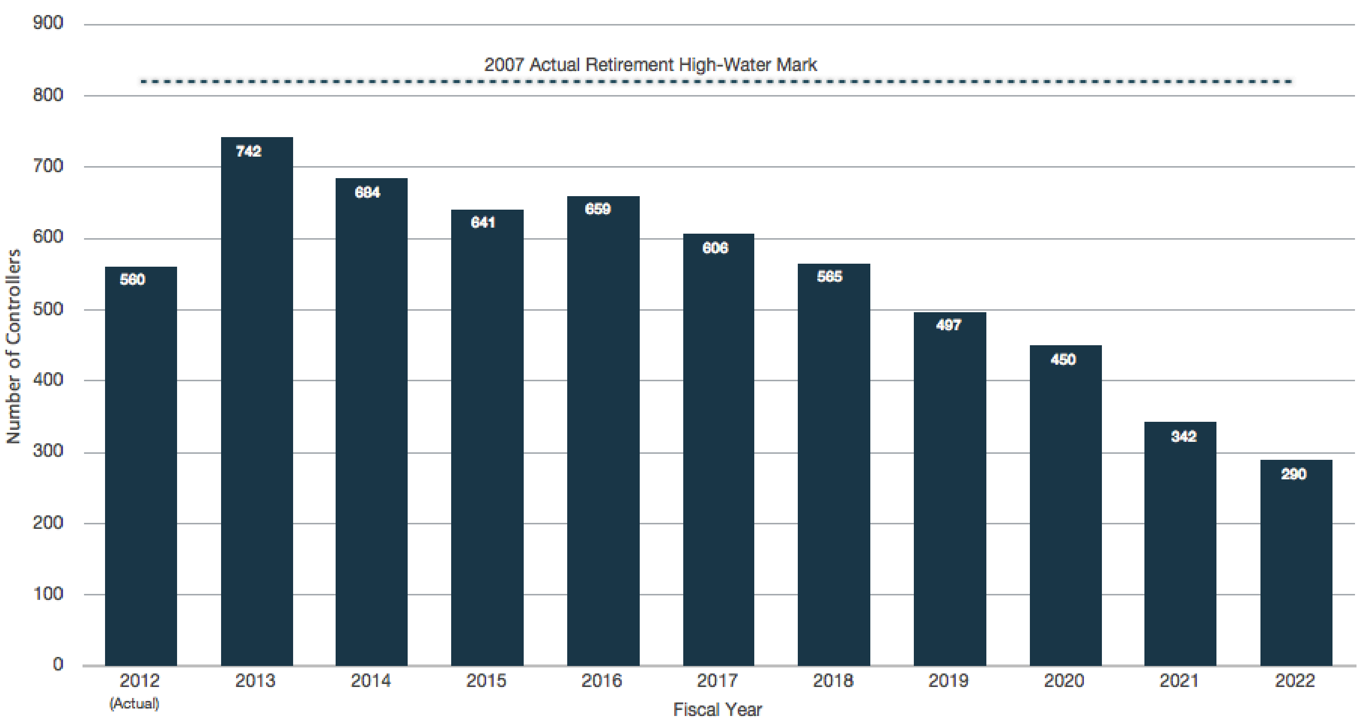
For the current plan, the agency incorporated FY 2012 retirement data into the retirement histogram used for future retirement.

As in prior years, the FAA projected future retirements by analyzing both the eligibility criteria of the workforce (Figure 4.3) and the pattern of retirement based on eligibility (Figure 4.4).

For each eligibility class (the fiscal year the controller first becomes eligible to retire), the agency applied the histogram percentage to estimate the retirements for each class by year.

In FY 2012, there were 560 controller retirements, a decrease of 55 versus a plan of 615. Year-to-date retirements for 2013 are trending at or slightly above the FY 2013 projection of 742 retirements.

**Figure 4.5: Retirement Projection**



# Chapter 4: Losses

## Controller Losses Due to Resignations, Removals and Deaths

Estimated controller losses due to resignations, removals (excluding developmental attrition) and deaths are based on historical rates and shown in Table 4.6.

**Table 4.2  Controller Losses Due to Resignations, Removals and Deaths**

| 2012* | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 48 | 48 | 48 | 48 | 49 | 49 | 49 | 49 | 49 | 50 |

## Developmental Attrition

Estimated losses of trainees who terminate from the FAA while still in developmental status are shown in Table 4.7. The agency has incorporated historical developmental attrition rates into the latest FAA forecasts.

**Table 4.3  Developmental Attrition**

| 2012* | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| 105 | 197 | 136 | 105 | 108 | 110 | 107 | 102 | 96 | 91 | 87 |

## Academy Attrition

Estimated loss figures from new hires who are not successful in the FAA Academy training program, before they ever reach an air traffic control facility, are based on historical rates and shown in Table 4.8.

**Table 4.4  Academy Attrition**

| 2012* | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| 138 | 115 | 176 | 187 | 195 | 189 | 177 | 162 | 153 | 146 | 142 |

*Actual


FLOW PAGE1

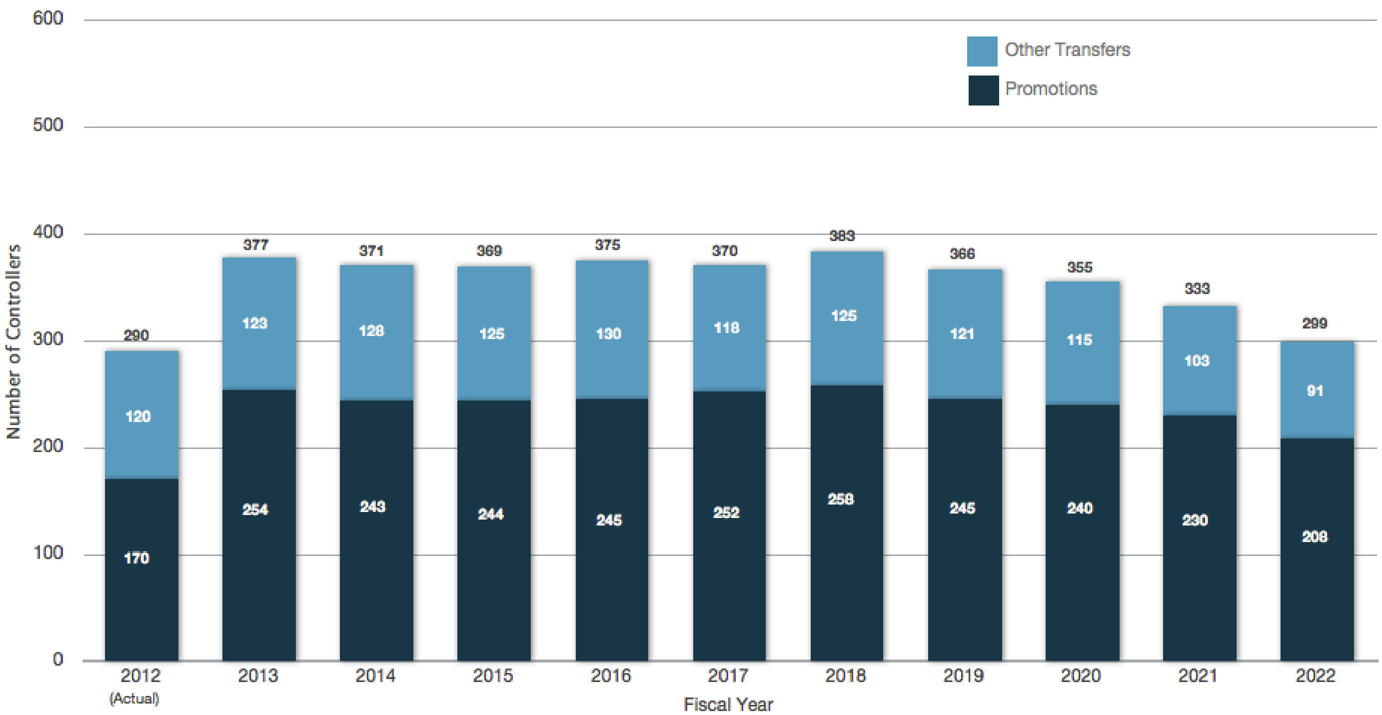
## Controller Losses Due to Promotions and Other Transfers

This section presents FAA estimates of controller losses due to internal transfers to other positions (staff support specialists, traffic management coordinators, etc.) and controller losses due to promotions to front line manager or air traffic management/supervisory positions.

In addition to backfilling for supervisory attrition (retirements, promotions, etc.), the FAA expects that the supervisor workforce will likely grow along with the controller workforce, and that these additional supervisors will also come from the controller population.

This forecast is also driven by the shifting demographics of these groups. In short, an increasing number of supervisors and other air traffic personnel will become retirement eligible after 2013, creating additional opportunities for current controllers to be promoted.

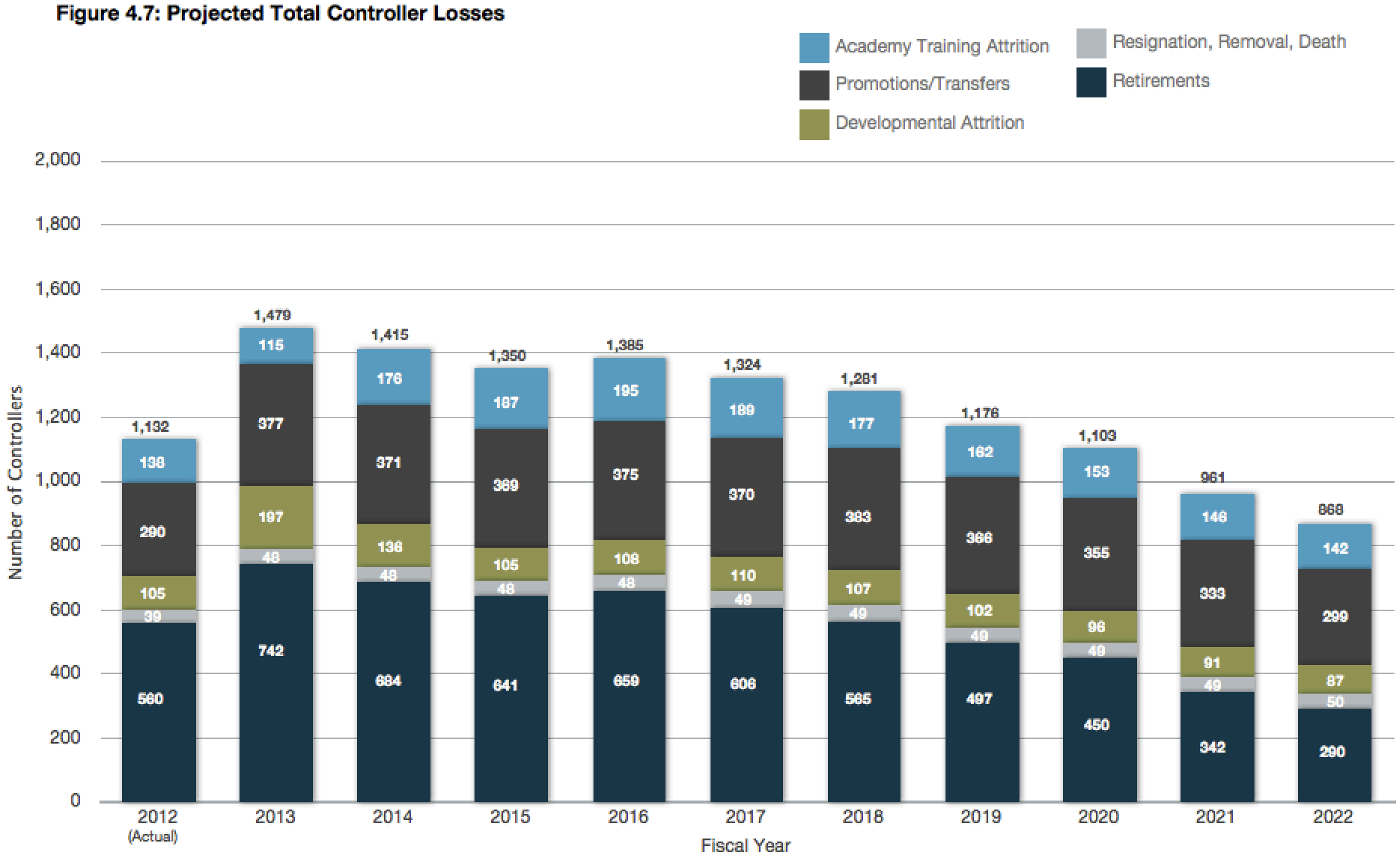
**Figure 4.6: Controller Losses Due to Promotions and other Transfers**



## Total Controller Losses

The FAA projects a total loss of 12,342 controllers over the next 10 years. Overall losses appear to be trending in line with projections for FY 2013.

Figure 4.7: Projected Total Controller Losses



## The FAA safely operates and maintains the NAS because of the combined expertise of its people, the support of technology and the application of standardized procedures. Every day tens of thousands of aircraft are guided safely and expeditiously through the NAS to their destinations.

Deploying a well-trained and well-staffed air traffic control workforce plays an essential role in fulfilling this responsibility. The FAA's current hiring plan has been designed to phase in new hires as needed. To staff the right number of people in the right places at the right time, the FAA develops annual hiring plans that are responsive to changes in traffic and in the controller workforce.

The FAA hires new developmentals in advance of the agency's staffing needs in order to have ample time to train them to offset future attrition, including retirements, promotions, etc. Proper execution of the hiring plan, while flexibly adapting to the dynamic nature of traffic and attrition, is critical to the plan's success. If the new developmentals are not placed correctly or if CPCs are not transferred from other facilities, shortages could occur at individual facilities that may affect schedules, increase overtime usage, or require the use of more developmentals on position.

Staffing is and will continue to be monitored at all facilities throughout the year. The agency will continue to modify the hiring plan at the facility level should adjustments become necessary due to changes in traffic volume, retirements or other attrition.

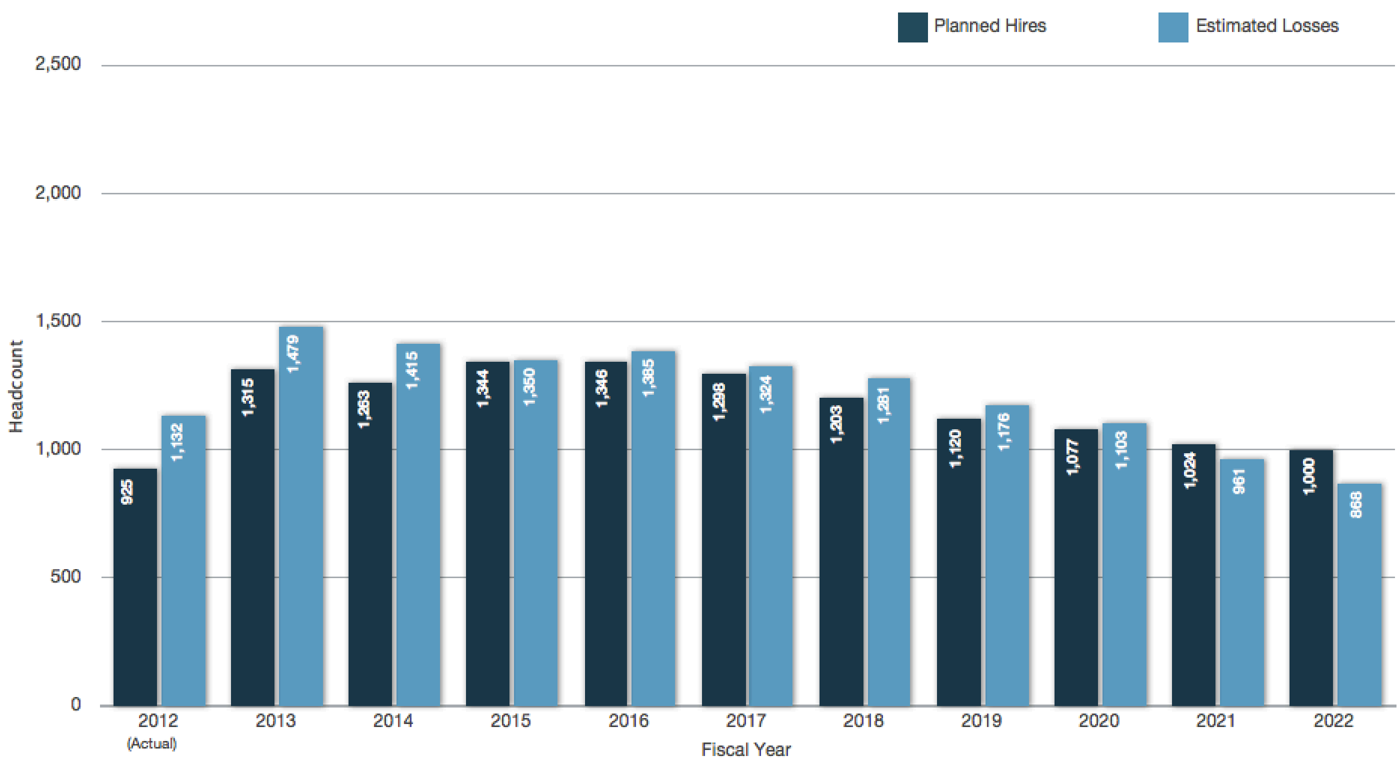
There are thousands of qualified controller candidates eager to be hired. The FAA has again been able to attract large numbers of qualified controller candidates in FY 2012. Through the various hiring sources, the FAA will maintain a sufficient number of applicants to achieve this hiring plan.

### Controller Hiring Profile

The controller hiring profile is shown in Figure 5.1. The number of planned hires is lower than the number of expected losses in the near term due to above-plan hiring from 2006 to 2008. The number of controllers projected to be hired through FY 2022 is 11,360.

> The FAA hired 925 new controllers in FY 2012, and has hired more than 6,600 controllers over the last five years.

**Figure 5.1: Controller Hiring Profile**



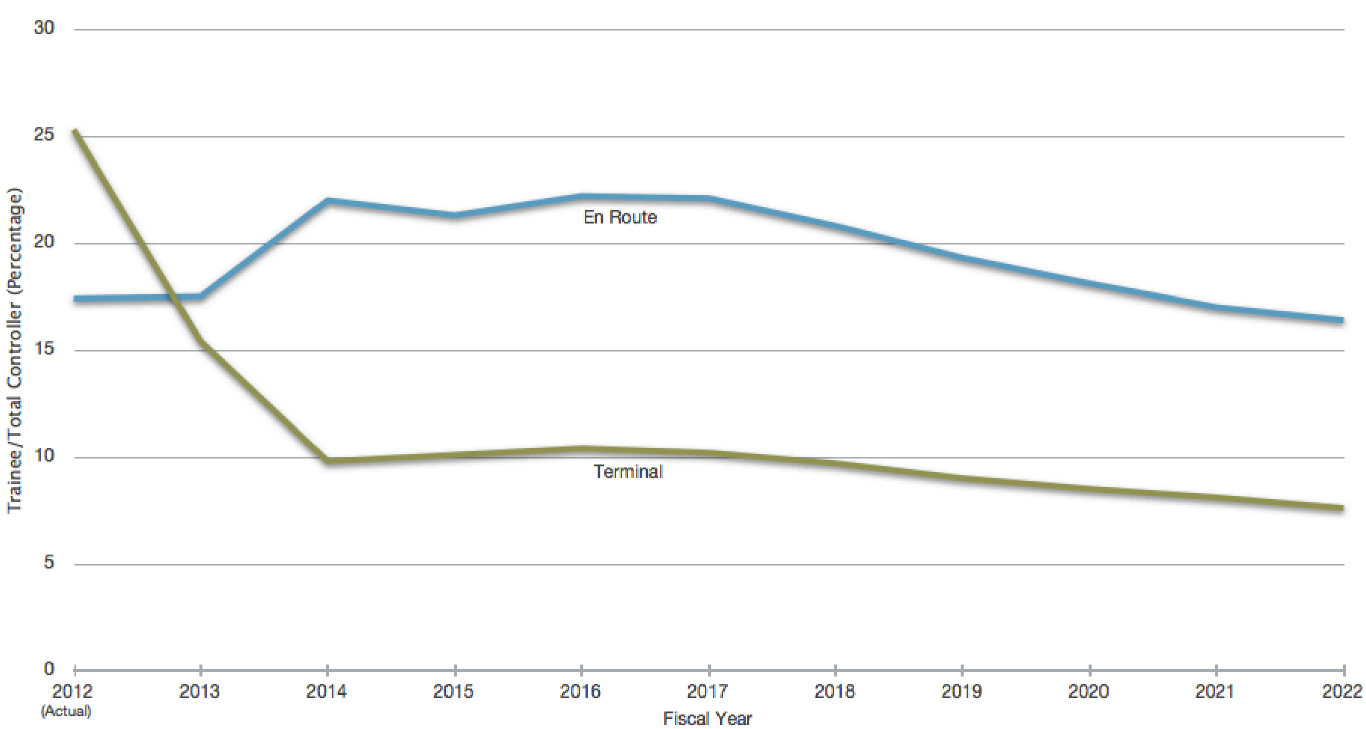
### Trainee-to-Total-Controller Percentage

The hiring plan allows the FAA to maintain an appropriate number of trainees (developmental and CPC-IT) in the workforce. While the FAA strives to keep trainees below 35 percent for both Terminal and En Route controllers, it is not the only metric used by the agency to measure trainee progress.

Figure 5.2 shows the projected trainee-to-total-controller percentages by year to 2022. The percentage shown is calculated as the sum of CPC-ITs plus developmentals divided by all controllers.

The general trend observed in Figure 5.2 shows the trainee percentage reaching a low point in the next one to two years as controllers in the current developmental pipeline become fully certified. The trainee percentage for both En Route and Terminal grows and reaches another peak, well below 35 percent, around 2015 and 2016 as new controllers are hired to account for expected attrition. Note the rate of growth and peak level for the En Route trainee ratio exceeds the Terminal ratio primarily because of the longer times to certify (on average) in En Route facilities. Additionally, a portion of future year hiring requirements have shifted from Terminal to En Route as developmental failures in En Route are given the opportunity to transfer and certify at lower-level Terminal facilities.

**Figure 5.2: Trainee to Total Controller Percentage**



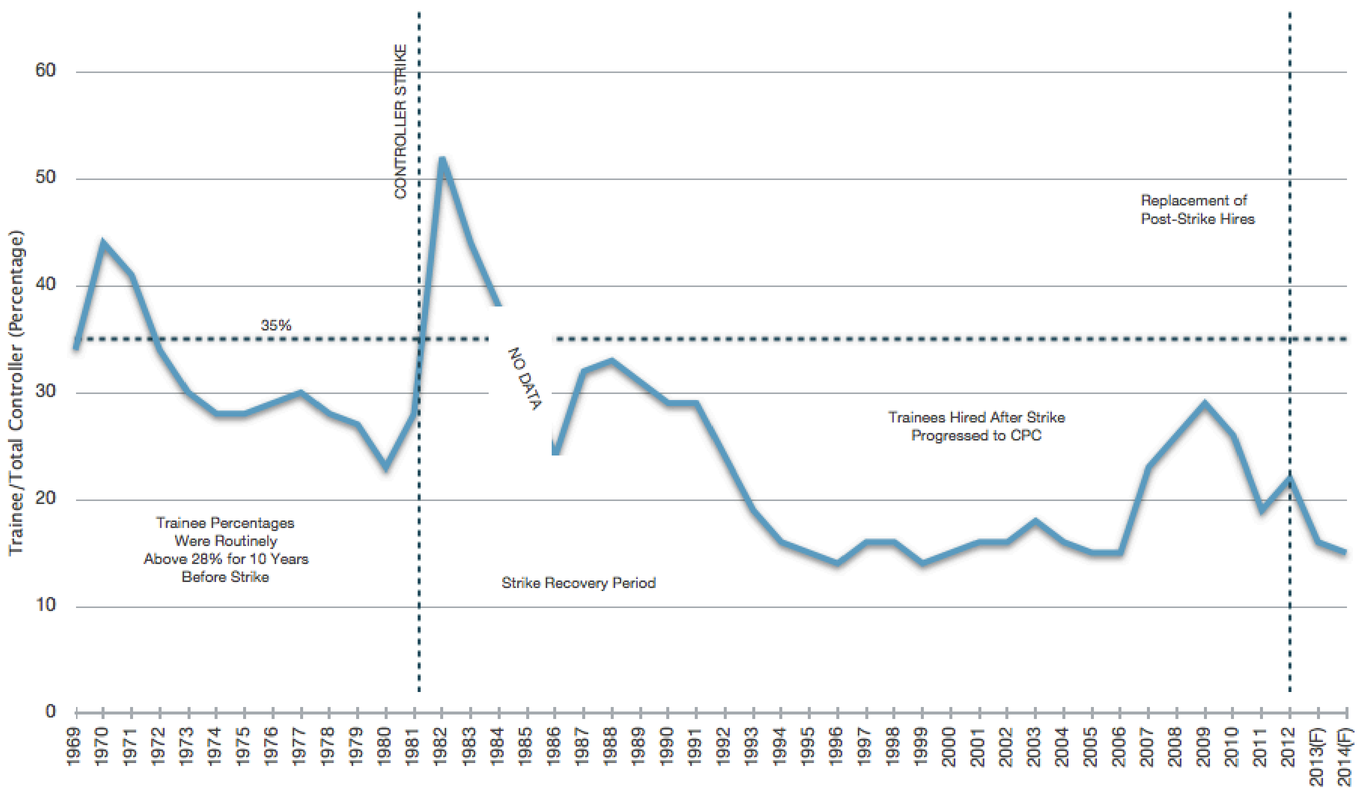
Before the 1981 strike, the FAA experienced trainee percentages ranging from 23 to 44 percent. Following the strike, through the end of the hiring wave in 1992, the trainee percentage ranged from 24 to 52 percent. When the post-strike hires became fully certified by the end of decade, the trainee percentage declined.

As the new controllers hired en masse in the early 1980s achieved full certification, the subsequent need for new hires dropped significantly from 1993 to 2006. This caused trainee percentages to reach unusually low levels. The FAA's current hiring plans return trainee percentages to their historical averages for the near term.

By phasing in new hires as needed, the FAA will level out the significant training spikes and troughs experienced over the last 40 years. Even though there was a long-expected peak in 2009, the percentage continues to drop as thousands of trainees become certified controllers.

Figure 5.3 shows historical trainee percentages from 1969 to the present.

**Figure 5.3: Historical Trainee Percentage**



The FAA uses many metrics (e.g., 35 percent trainee to total controllers) to manage the flow of trainees while accomplishing daily operations. Facilities meter training to coincide with a number of dynamic factors, including technology upgrades, new runway construction and recurrent proficiency training for existing CPCs. Facility training is enabled by many factors. Examples include the use of contract instructors, access to simulators, scheduled overtime, and the seasonality and complexity of operations.

In itself, the actual number of trainees does not indicate the progress of each individual in the training program or the additional utility they provide that can help to supplement other on-the-job training instruction and support operations. A key facility measure of training performance is whether trainees are completing their training within the agency's facility benchmarks. The goal ranges from one and one-half years at our lower-level Terminal facilities to three years at our En Route facilities.

The FAA is achieving these goals by improving training and scheduling processes through increased use of simulators and better tracking of controller training using the FAA's national training database.

The FAA will continue to closely monitor facilities to make sure trainees are progressing through each stage of training while also maintaining the safe and efficient operation of the NAS.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# Chapter 6: Hiring Process

### Controller Hiring Sources

The FAA has three major categories of controller hiring sources.

Previous controllers: These individuals have prior FAA or Department of Defense (civilian or military) air traffic control experience.

Air Traffic Collegiate Training Initiative (AT-CTI) students: These individuals have successfully completed an aviation-related program of study from a school under the FAA's AT-CTI program.

General public: These individuals are not required to have prior air traffic control experience and may apply for vacancies announced by the FAA.

### Recruitment

The agency continues to attract and recruit high-quality applicants into the controller workforce to meet staffing requirements. Of the 925 controllers hired in FY 2012, 467 were graduates of AT-CTI schools, 268 were hired from the general public, while an additional 190 had previous air traffic control experience.

Due to the thousands of qualified air traffic controller applicants available from previously advertised general public announcements, the agency did not offer a vacancy announcement to this pool in FY 2012; however, we are planning to open a general public announcement in FY 2014 to add more depth and diversity to our controller hiring sources. The FAA issued an open, continuous announcement for AT-CTI graduates. Announcements were also opened for retired military controllers, veterans eligible under the Veterans' Recruitment Appointment Authority, control tower operators, as well as current and former civilian air traffic controllers. The number of people in the hiring pool varies during the year as the agency recruits applicants, evaluates them and draws from the pool. However, the overall goal is to maintain at least 2,000 to 3,000 applicants available for consideration by selection panels at any one time. During FY 2012, the agency's recruitment and advertising activities enabled the FAA to far exceed this pool's target range. At the conclusion of FY 2012, the FAA's pool totaled over 5,000 applicants.

As an added recruitment incentive, the agency also can offer eligible developmental controllers Montgomery GI Bill education benefits. This flexibility enables us to increase the size of the pool, which helps us meet our controller hiring goals.

## General Hiring Process

Applicants from the general public must achieve a qualifying score on the Air Traffic Selection and Training (AT-SAT) examination. The AT-SAT tests for characteristics needed to perform effectively as an air traffic controller. The characteristics include numeric ability, prioritization, planning, tolerance for high intensity, decisiveness, visualization, problem solving and movement detection. The agency does not anticipate that these controller characteristics/competencies will change as NextGen technologies are introduced.

Additionally, all applicants must also meet the following requirements:

- Complete three years of progressively responsible work experience, or a full four-year course of study leading to a bachelor's degree, or an equivalent combination of work experience and college credits.
- Be a U.S. citizen.
- Be able to speak English clearly enough to be understood over radios, intercoms and similar communications equipment.
- Be no older than age 30.
- Pass stringent medical and psychological exams, an extensive security background investigation and an interview.

Complete details can be found on the FAA's website at http://www.faa.gov/jobs.

## One of the primary goals of the FAA's technical training and development programs is to ensure that our air traffic controllers have all the necessary skills and abilities to perform their jobs effectively and maintain the safety of the NAS.

The FAA's technical training framework is designed to provide controllers with training to meet the challenges of today and prepare them for the next generation of air traffic management.

In early 2012, the FAA completed an organizational restructuring designed to improve the integration of safety into all aspects of air traffic services. The new Office of Safety and Technical Training in the Air Traffic Organization is helping the agency firmly instill the FAA's safety mission in controllers from the start of their careers. The powerful combination of safety, training and quality assurance under the same leadership structure enhances the FAA's ability to identify, mitigate and manage risks, and integrate lessons learned into the technical training curriculum. The training program for air traffic controllers is governed by FAA Order 3120.4, Air Traffic Technical Training; the organization has committed to initiate an annual review process to update the training order to ensure technical accuracy and compliance.

### FAA's Call to Action

The FAA convened an Independent Review Panel (IRP) in 2011 to review air traffic controller selection, assignment and training as part of a nationwide Call to Action on air traffic control safety and professionalism. The panel produced 49 recommendations that can be found at the following link: http://www.faa.gov/news/press_releases/news_story. cfm?newsId=13132.

In line with the IRP's recommendations, the FAA continues to improve processes for hiring and training the controller workforce. Many of these efforts were under way before the IRP began its review (e.g., professional standards, organizational structure and recurrent training). The Office of Safety and Technical Training has evaluated the IRP's recommendations and adapted several into new projects for the overall improvement of the training program, with some projects already completed before the end of FY 2012. For example, the next controller training instruction will require on-the-job training instructors to have one year of experience versus the current six-month requirement. The FAA is also increasing data sharing with AT-CTI partners so they are getting better feedback on their alumni. Curriculum will be restructured so controllers will have a more well-rounded understanding of the air traffic system during initial training at the FAA Academy. Students will demonstrate abilities earlier on, and those assigned to more complex facilities will get enhanced training before they leave the FAA Academy.

## The Training Process

Training begins at the FAA Academy where students gain foundational ATC knowledge. Later at the facilities, they receive the necessary training to become certified professional controllers (CPC). All controllers have periodic refresher training to maintain proficiency.

The FAA is adopting an outcome-based approach to the design and development of training, based on one of the recommendations from the IRP. The outcome-based approach refers to the strategy used to design individual courses and is based on the performance requirements found in the competency model. It uses the collection of job tasks, knowledge, skills and abilities to define the operational outcome required for the controller's job so that training can be designed accordingly. The newer approach includes mapping curriculum to job tasks, knowledge, skills and training methods. The techniques apply to new course development, redesigns and updates.

> The FAA continues to invest in making its training more effective by gearing it toward the skills needed for successful career-long development.

## FAA Academy Training

The FAA Academy trains new controllers using lecture, computer-based instruction, and simulation with a range of fidelity. The FAA Academy lays the foundation for controller development by teaching common, fundamental air traffic control procedures that are used throughout the country.

In 2011, the FAA began looking at ways to modernize courses at the FAA Academy, expanding the required level of knowledge and increasing students' proficiency. Enhanced training content ensures the FAA can bridge the gap between the FAA Academy training and field requirements at the higher-level facilities. This effort achieves the goals of improving quality and increasing the effectiveness of training as controllers reach CPC.

## FAA Facility Training

After graduating from the FAA Academy, developmental controllers begin facility training in the classroom, where they learn facility-specific rules and procedures. Often, these rules and procedures are practiced in simulation. The FAA is increasing the use of simulators - technology that allows instructors to duplicate and play back actual operating events to give students opportunities for improvement in a safe environment. Simulators enable students to not only see the cause and effect, but also to avoid mistakes in the future. Until recently, controllers working in airport traffic control towers trained solely on live air traffic. Since live traffic is inconsistent and unpredictable due to weather and system delays, a controller may have to wait days or weeks for an opportunity to learn a particular procedure, and even longer to become proficient at it. The FAA uses simulation to help compress the training timeline while also improving the students' learning experience and reducing training costs.

After classroom and simulation training are complete, developmental controllers begin on-the-job training on operational positions. This training is conducted by CPCs who observe and instruct developmental controllers working the control position. Once they are certified on control positions, developmental controllers often work independently on those positions under the direction of a supervisor to gain experience and to supplement staffing.

For current controllers, the recently initiated Flight Deck Training (FDT) program is designed to improve understanding and communications between controllers and pilots. It gives controllers a perspective from the flight deck during flight. As part of supplemental training at FAA field facilities, it focuses on specific outcomes that complement the overall controller training curriculum.

### Recurrent Training

In the field, the FAA has a renewed emphasis on proficiency training for current CPCs via a new initiative called Recurrent Training 2012. This new training initiative is designed to promote a safety culture and move facilities to the next level of safety. It is a combination of cadre-led and computer-based instruction for air traffic controllers that delivers innovative recurrent training and incorporates lessons learned from the Air Traffic Safety Action Program (ATSAP), and Quality Assurance and Quality Control activities.

The Office of Safety and Technical Training is also working on the initial design phases of an annual recurrent training course for its on-the-job training field instructors. It is especially important for field instructors to maintain proficiency on all of the latest skills, new procedures and technologies coming into the system through NextGen improvements. This is another effort that was recommended and supported by the IRP.

### Infrastructure Investments

The FAA is investing in its infrastructure to ensure facilities are equipped with the computers, bandwidth and technology required to deliver enhanced technology-based training. Facility training has improved with the deployment of dedicated training computers and changes to FAA Order 3120.4, Air Traffic Technical Training. Activities already under way include:

- Increased use of simulators in all phases of training during a controller's career. Simulators allow students to obtain practical learning experience and effectively move from theory to application. Simulator training better prepares junior controllers for the transition to live traffic. By increasing the use of simulators for proficiency training, controllers have the opportunity to practice seldom-used procedures and increase technical proficiency. It also has the potential to reduce time to certification for CPC controllers who transfer to new facilities.

- Location of simulators at the FAA Academy and at the En Route and Terminal facilities to support training. We are currently exploring the feasibility of deploying technology to allow remote simulation capabilities to reduce the distance and travel time for controllers at smaller facilities' simulators.

- Expansion of the FAA Academy's Automated Radar Terminal System Color Display (ACD) lab in Oklahoma City. Students use the ACD lab terminal radar simulation to practice air traffic concepts and complexities, such as multiple arrivals involving various types of aircraft and sequencing departures within arrivals.

- Increased facility access to the SimFast Terminal radar simulator, a scenario generation tool and low-cost simulation software that provides radar simulation training capability via the personal computer (PC). SimFast enables smaller facilities to provide PC-to-PC simulations involving a pilot operator and a trainee without requiring expensive radar equipment. SimFast installation coincided with Computer Based Instruction (CBI) upgrades at the facilities.

## Time to Certification

The FAA continues to meet its overall goals for time to certification and number of controllers certified. Implementation of NextGen platforms such as En Route Automation Modernization (ERAM) and new training requirements are factors that affect overall time to CPC. Depending on the type of facility, facility level (complexity), and the number of candidates to certify, controllers are generally completing certification in one and one-half to three years.

Table 7.1 shows the FAA's training targets by facility type as well as actual training times for controllers who reached CPC between FY 2010 and FY 2012.

**Table 7.1 Years to Certify**

| Facility Type | Facility Level | Training Target | FY 2010 | FY 2011 | FY 2012 |
|---|---|---|---|---|---|
| **En Route** | All | 3.0 | 2.62 | 2.79 | 2.94 |
| **Terminal** | 4-6 | 1.5 | 1.39 | 1.34 | 1.42 |
| | 7-9 | 2.0 | 1.82 | 2.01 | 2.07 |
| | 10-12 | 2.5 | 2.01 | 2.39 | 2.75 |

Developmental controllers who fail to certify at a facility may be removed from service or reassigned to a less complex facility in accordance with agency policies and directives. The ultimate goal of the training program is for the controller to achieve certification on all positions at a facility and attain CPC status while maintaining the safety of the NAS.

## Preparing for NextGen

The Office of Safety and Technical Training provides critical input to support implementation of NextGen. Training professionals are part of an FAA team that evaluates how NextGen will change the air traffic work environment and what competencies will be required for the future workforce. The FAA is incorporating what it learns from this evolving and ongoing process into training programs as new systems are implemented. Outcomes-based training aligns NextGen functionality with job tasks as well, so that the training organization can make predictions on how programs will need to change with the advent of NextGen.

Some of the Technical Training office's NextGen training efforts involve the Traffic Management Advisor (TMA), ERAM, Airport Surface Detection Equipment – Model X (ASDE-X) and ADS-B.

- TMA has been recognized in the FAA Flight Plan as one of the building blocks of NextGen. The Traffic Management Advisor for the cadre course, currently under development, is designed for those who need to demonstrate TMA subject matter expertise, use all elements of TMA to safely and efficiently move aircraft through the NAS, explain the impact of controllers' TMA actions and procedures on other elements of the NAS, and train other TMA users.

- Multiple courses covering ERAM have been implemented to support the transition of En Route facilities to this new technology. Courses include workforce training, refresher training, supplemental training, and cadre training for instructors who deliver training in the field. These various courses enable a consistent yet flexible delivery of ERAM training as facilities cycle through the phases of system implementation.
- ASDE-X training is a two-day blended-media training course that employs a brief introductory lecture, computer-based instruction with a knowledge and performance check, and hands-on practice with actual equipment. Instructors deliver the training at the controller's facility. Several enhancements to the ASDE-X system have been developed and each has been fielded with effective training to inform controllers of the changes to the system.
- ADS-B training combines instructor-led training with hands-on performance verification on the actual equipment. This training covers ADS-B, FUSED Mode and associated new functionality in the Standard Terminal Automation Replacement System (STARS).


BARCO
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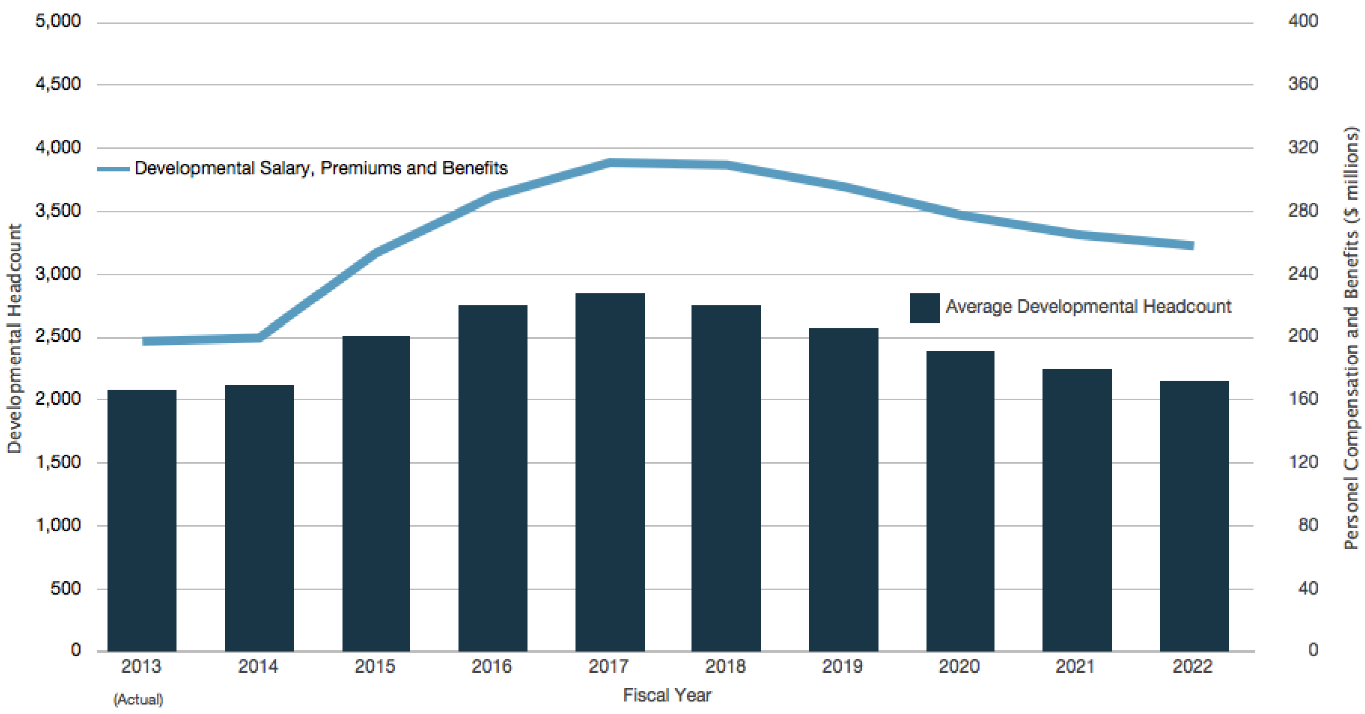
GVISION

In addition to direct training costs, the FAA will incur salary and other costs for developmentals before they certify. The average cost of a developmental in FY 2013 is projected to be $94,868.

Figure 8.1 depicts expected annual compensation costs of developmentals, as well as the expected number of developmentals by year through 2022. As training takes one and one-half to three years, the chart depicts a rolling total of hires and costs from the current and previous years. It also incorporates the effect of the controller contract.

**Figure 8.1: Estimated Cost of Developmentals Before Certification**



# Appendix A: En Route Facility Controller Staffing Ranges

Appendix A, below, presents controller staffing ranges, by facility, for En Route air traffic control facilities for FY 2013. Appendix B presents controller staffing ranges, by facility, for Terminal facilities for FY 2013. These ranges include the number of controllers needed to perform the work. While most of the work is accomplished by CPCs, work is also being performed in facilities by CPC-ITs and position-qualified developmentals who are proficient, or checked out, in specific sectors or positions and handle workload independently.

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| ZAB | Albuquerque ARTCC | 192 | 5 | 46 | 243 | 171 | 209 |
| ZAN | Anchorage ARTCC | 93 | 2 | 12 | 107 | 83 | 101 |
| ZAU | Chicago ARTCC | 336 | 22 | 44 | 402 | 285 | 348 |
| ZBW | Boston ARTCC | 246 | 13 | 22 | 281 | 203 | 248 |
| ZDC | Washington ARTCC | 260 | 18 | 91 | 369 | 260 | 317 |
| ZDV | Denver ARTCC | 252 | 14 | 55 | 321 | 232 | 283 |
| ZFW | Fort Worth ARTCC | 266 | 20 | 31 | 317 | 231 | 282 |
| ZHU | Houston ARTCC | 243 | 14 | 34 | 291 | 195 | 239 |
| ZID | Indianapolis ARTCC | 319 | 3 | 28 | 350 | 256 | 313 |
| ZJX | Jacksonvile ARTCC | 265 | 13 | 54 | 332 | 227 | 277 |
| ZKC | Kansas City ARTCC | 247 | 6 | 28 | 281 | 196 | 240 |
| ZLA | Los Angeles ARTCC | 217 | 17 | 49 | 283 | 230 | 281 |
| ZLC | Salt Lake City ARTCC | 190 | 7 | 13 | 210 | 140 | 171 |
| ZMA | Miami ARTCC | 241 | 8 | 51 | 300 | 188 | 230 |
| ZME | Memphis ARTCC | 240 | 9 | 48 | 297 | 228 | 278 |
| ZMP | Minneapolis ARTCC | 265 | 8 | 23 | 296 | 214 | 262 |
| ZNY | New York ARTCC | 248 | 10 | 75 | 333 | 236 | 289 |
| ZOA | Oakland ARTCC | 154 | 14 | 44 | 212 | 185 | 226 |
| ZOB | Cleveland ARTCC | 342 | 7 | 25 | 374 | 273 | 334 |
| ZSE | Seattle ARTCC | 152 | 8 | 14 | 174 | 131 | 160 |
| ZSU | San Juan ARTCC | 36 | 5 | 11 | 52 | 44 | 54 |
| ZTL | Atlanta ARTCC | 374 | 13 | 51 | 438 | 269 | 328 |
| ZUA | Guam ARTCC | 9 | 3 | 3 | 15 | 15 | 19 |

# Appendix B: Terminal Facility Controller Staffing Ranges

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| A11 | Anchorage TRACON | 22 | 6 | 3 | 31 | 23 | 28 |
| A80 | Atlanta TRACON | 74 | 15 | 5 | 94 | 78 | 95 |
| A90 | Boston TRACON | 62 | 4 | 0 | 66 | 49 | 60 |
| ABE | Allentown Tower | 19 | 4 | 6 | 29 | 21 | 26 |
| ABI | Abilene Tower | 15 | 0 | 7 | 22 | 16 | 20 |
| ABQ | Albuquerque Tower | 32 | 1 | 4 | 37 | 27 | 33 |
| ACK | Nantucket Tower | 13 | 0 | 1 | 14 | 10 | 12 |
| ACT | Waco Tower | 13 | 1 | 6 | 20 | 17 | 21 |
| ACY | Atlantic City Tower | 19 | 3 | 6 | 28 | 22 | 27 |
| ADS | Addison Tower | 12 | 2 | 2 | 16 | 9 | 11 |
| ADW | Andrews Tower | 16 | 1 | 2 | 19 | 11 | 14 |
| AFW | Alliance Tower | 15 | 1 | 3 | 19 | 11 | 13 |
| AGC | Allegheny Tower | 12 | 1 | 5 | 18 | 11 | 14 |
| AGS | Augusta Tower | 14 | 1 | 4 | 19 | 13 | 16 |
| ALB | Albany Tower | 21 | 1 | 7 | 29 | 23 | 28 |
| ALO | Waterloo Tower | 10 | 0 | 3 | 13 | 12 | 15 |
| AMA | Amarillo Tower | 15 | 0 | 8 | 23 | 15 | 19 |
| ANC | Anchorage Tower | 25 | 1 | 1 | 27 | 22 | 27 |
| APA | Centennial Tower | 17 | 2 | 5 | 24 | 19 | 24 |
| APC | Napa Tower | 9 | 0 | 3 | 12 | 7 | 8 |
| ARB | Ann Arbor Tower | 11 | 0 | 0 | 11 | 5 | 7 |
| ARR | Aurora Tower | 10 | 3 | 0 | 13 | 7 | 8 |
| ASE | Aspen Tower | 8 | 1 | 4 | 13 | 13 | 15 |
| ATL | Atlanta Tower | 44 | 9 | 0 | 53 | 44 | 53 |
| AUS | Austin Tower | 27 | 5 | 7 | 39 | 35 | 43 |

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| AVL | Asheville Tower | 13 | 0 | 5 | 18 | 14 | 17 |
| AVP | Wilkes-Barre Tower | 20 | 0 | 2 | 22 | 18 | 23 |
| AZO | Kalamazoo Tower | 15 | 0 | 7 | 22 | 13 | 16 |
| BDL | Bradley Tower | 14 | 1 | 3 | 18 | 11 | 14 |
| BED | Hanscom Tower | 16 | 0 | 1 | 17 | 10 | 13 |
| BFI | Boeing Tower | 21 | 2 | 5 | 28 | 20 | 25 |
| BFL | Bakersfield Tower | 15 | 2 | 2 | 19 | 19 | 24 |
| BGM | Binghamton Tower | 10 | 0 | 9 | 19 | 13 | 16 |
| BGR | Bangor Tower | 13 | 1 | 8 | 22 | 18 | 22 |
| BHM | Birmingham Tower | 24 | 3 | 4 | 31 | 22 | 27 |
| BIL | Billings Tower | 16 | 1 | 4 | 21 | 16 | 20 |
| BIS | Bismarck Tower | 13 | 0 | 4 | 17 | 13 | 16 |
| BJC | Broomfield Tower | 14 | 1 | 0 | 15 | 9 | 11 |
| BNA | Nashville Tower | 35 | 4 | 7 | 46 | 34 | 41 |
| BOI | Boise Tower | 21 | 4 | 4 | 29 | 21 | 26 |
| BOS | Boston Tower | 26 | 6 | 0 | 32 | 26 | 32 |
| BPT | Beaumont Tower | 12 | 0 | 2 | 14 | 9 | 11 |
| BTR | Baton Rouge Tower | 12 | 2 | 6 | 20 | 17 | 20 |
| BTV | Burlington Tower | 15 | 1 | 7 | 23 | 16 | 20 |
| BUF | Buffalo Tower | 24 | 2 | 16 | 42 | 25 | 30 |
| BUR | Burbank Tower | 14 | 2 | 6 | 22 | 14 | 18 |
| BWI | Baltimore Tower | 25 | 3 | 2 | 30 | 20 | 24 |
| C90 | Chicago TRACON | 67 | 17 | 7 | 91 | 77 | 94 |
| CAE | Columbia Tower | 22 | 0 | 6 | 28 | 21 | 25 |
| CAK | Akron-Canton Tower | 21 | 1 | 7 | 29 | 20 | 25 |

# Appendix B: Terminal Facility Controller Staffing Ranges

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| CCR | Concord Tower | 8 | 1 | 2 | 11 | 7 | 9 |
| CDW | Caldwell Tower | 11 | 0 | 2 | 13 | 8 | 9 |
| CHA | Chatanooga Tower | 15 | 2 | 9 | 26 | 16 | 20 |
| CHS | Charleston Tower | 22 | 1 | 7 | 30 | 21 | 26 |
| CID | Cedar Rapids Tower | 15 | 0 | 2 | 17 | 14 | 17 |
| CKB | Clarksburg Tower | 14 | 0 | 4 | 18 | 14 | 18 |
| CLE | Cleveland Tower | 37 | 10 | 9 | 56 | 39 | 48 |
| CLT | Charlotte Tower | 63 | 20 | 3 | 86 | 75 | 92 |
| CMA | Camarillo Tower | 6 | 2 | 5 | 13 | 8 | 10 |
| CMH | Columbus Tower | 47 | 5 | 3 | 55 | 38 | 47 |
| CMI | Champaign Tower | 14 | 0 | 7 | 21 | 15 | 18 |
| CNO | Chino Tower | 8 | 1 | 5 | 14 | 9 | 12 |
| COS | Colorado Springs Tower | 26 | 2 | 8 | 36 | 22 | 27 |
| CPR | Casper Tower | 9 | 0 | 8 | 17 | 14 | 17 |
| CPS | Downtown Tower | 11 | 0 | 0 | 11 | 9 | 10 |
| CRP | Corpus Christi Tower | 23 | 5 | 10 | 38 | 36 | 44 |
| CRQ | Palomar Tower | 17 | 0 | 0 | 17 | 9 | 12 |
| CRW | Charleston Tower | 20 | 1 | 6 | 27 | 20 | 25 |
| CSG | Columbus Tower | 6 | 0 | 2 | 8 | 5 | 7 |
| CVG | Cincinnati Tower | 55 | 5 | 6 | 66 | 41 | 51 |
| D01 | Denver TRACON | 55 | 16 | 2 | 73 | 72 | 87 |
| D10 | Dallas - Ft Worth TRACON | 58 | 15 | 9 | 82 | 74 | 90 |
| D21 | Detroit TRACON | 32 | 12 | 13 | 57 | 53 | 65 |
| DAB | Daytona Beach Tower | 42 | 7 | 7 | 56 | 47 | 57 |
| DAL | Dallas Love Tower | 22 | 2 | 0 | 24 | 17 | 20 |

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| DAY | Dayton Tower | 16 | 1 | 0 | 17 | 11 | 14 |
| DCA | Washington National Tower | 26 | 4 | 2 | 32 | 23 | 28 |
| DEN | Denver Tower | 38 | 2 | 0 | 40 | 35 | 42 |
| DFW | DFW Tower | 51 | 10 | 0 | 61 | 45 | 55 |
| DLH | Duluth Tower | 16 | 3 | 6 | 25 | 17 | 20 |
| DPA | Dupage Tower | 9 | 1 | 5 | 15 | 10 | 12 |
| DSM | Des Moines Tower | 20 | 0 | 5 | 25 | 20 | 25 |
| DTW | Detroit Tower | 38 | 2 | 0 | 40 | 28 | 34 |
| DVT | Deer Valley Tower | 18 | 0 | 3 | 21 | 18 | 23 |
| DWH | Hooks Tower | 14 | 2 | 3 | 19 | 10 | 13 |
| E10 | High Desert TRACON | 18 | 5 | 7 | 30 | 25 | 31 |
| ELM | Elmira Tower | 5 | 1 | 8 | 14 | 14 | 17 |
| ELP | El Paso Tower | 18 | 2 | 6 | 26 | 19 | 23 |
| EMT | El Monte Tower | 12 | 0 | 1 | 13 | 6 | 8 |
| ERI | Erie Tower | 13 | 3 | 5 | 21 | 16 | 19 |
| EUG | Eugene Tower | 17 | 2 | 3 | 22 | 16 | 20 |
| EVV | Evansville Tower | 20 | 0 | 7 | 27 | 14 | 18 |
| EWR | Newark Tower | 24 | 7 | 2 | 33 | 29 | 36 |
| F11 | Central Florida TRACON | 39 | 12 | 1 | 52 | 46 | 56 |
| FAI | Fairbanks Tower | 15 | 3 | 2 | 20 | 20 | 25 |
| FAR | Fargo Tower | 14 | 4 | 6 | 24 | 16 | 19 |
| FAT | Fresno Tower | 22 | 3 | 4 | 29 | 26 | 32 |
| FAY | Fayetteville Tower | 16 | 2 | 11 | 29 | 22 | 27 |
| FCM | Flying Cloud Tower | 12 | 2 | 1 | 15 | 8 | 9 |
| FFZ | Falcon Tower | 14 | 1 | 1 | 16 | 12 | 14 |

# Appendix B: Terminal Facility Controller Staffing Ranges

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| FLL | Fort Lauderdale Tower | 27 | 0 | 1 | 28 | 20 | 24 |
| FLO | Florence Tower | 11 | 2 | 6 | 19 | 13 | 15 |
| FNT | Flint Tower | 16 | 1 | 1 | 18 | 14 | 17 |
| FPR | St Lucie Tower | 11 | 0 | 4 | 15 | 9 | 11 |
| FRG | Farmingdale Tower | 14 | 0 | 4 | 18 | 13 | 16 |
| FSD | Sioux Falls Tower | 17 | 0 | 3 | 20 | 15 | 18 |
| FSM | Fort Smith Tower | 24 | 0 | 7 | 31 | 19 | 23 |
| FTW | Meacham Tower | 9 | 3 | 4 | 16 | 11 | 13 |
| FWA | Fort Wayne Tower | 16 | 0 | 8 | 24 | 18 | 23 |
| FXE | Fort Lauderdale Executive Tower | 15 | 0 | 6 | 21 | 13 | 16 |
| GCN | Grand Canyon Tower | 7 | 2 | 0 | 9 | 9 | 12 |
| GEG | Spokane Tower | 26 | 1 | 5 | 32 | 24 | 30 |
| GFK | Grand Forks Tower | 18 | 1 | 3 | 22 | 21 | 26 |
| GGG | Longview Tower | 13 | 1 | 5 | 19 | 14 | 17 |
| GPT | Gulfport Tower | 11 | 2 | 11 | 24 | 15 | 18 |
| GRB | Green Bay Tower | 25 | 0 | 4 | 29 | 16 | 20 |
| GRR | Grand Rapids Tower | 22 | 0 | 4 | 26 | 18 | 21 |
| GSO | Greensboro Tower | 23 | 6 | 8 | 37 | 23 | 29 |
| GSP | Greer Tower | 17 | 0 | 9 | 26 | 17 | 21 |
| GTF | Great Falls Tower | 12 | 1 | 7 | 20 | 17 | 21 |
| HCF | Honolulu Control Facility | 72 | 11 | 22 | 105 | 79 | 97 |
| HEF | Manassas Tower | 9 | 0 | 5 | 14 | 9 | 12 |
| HIO | Hillsboro Tower | 14 | 1 | 2 | 17 | 12 | 15 |
| HLN | Helena Tower | 8 | 1 | 3 | 12 | 8 | 10 |
| HOU | Hobby Tower | 25 | 1 | 2 | 28 | 16 | 20 |

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| HPN | Westchester Tower | 14 | 2 | 10 | 26 | 14 | 17 |
| HSV | Huntsville Tower | 17 | 1 | 8 | 26 | 17 | 20 |
| HTS | Huntington Tower | 15 | 0 | 9 | 24 | 18 | 23 |
| HUF | Terre Haute Tower | 15 | 0 | 8 | 23 | 17 | 21 |
| HWD | Hayward Tower | 8 | 1 | 6 | 15 | 9 | 11 |
| I90 | Houston TRACON | 75 | 15 | 7 | 97 | 88 | 107 |
| IAD | Dulles Tower | 33 | 0 | 3 | 36 | 26 | 32 |
| IAH | Houston Intercontinental Tower | 36 | 4 | 0 | 40 | 32 | 39 |
| ICT | Wichita Tower | 33 | 6 | 2 | 41 | 29 | 35 |
| ILG | Wilmington Tower | 11 | 1 | 2 | 14 | 9 | 11 |
| ILM | Wilmington Tower | 14 | 0 | 6 | 20 | 14 | 18 |
| IND | Indianapolis Tower | 44 | 10 | 8 | 62 | 35 | 42 |
| ISP | Islip Tower | 12 | 0 | 7 | 19 | 12 | 15 |
| ITO | Hilo Tower | 12 | 2 | 6 | 20 | 16 | 19 |
| JAN | Jackson Tower | 13 | 3 | 4 | 20 | 14 | 17 |
| JAX | Jacksonville Tower | 29 | 4 | 19 | 52 | 38 | 46 |
| JFK | Kennedy Tower | 28 | 4 | 4 | 36 | 28 | 35 |
| JNU | Juneau Tower | 12 | 1 | 0 | 13 | 11 | 13 |
| K90 | Cape TRACON | 19 | 0 | 5 | 24 | 20 | 25 |
| L30 | Las Vegas TRACON | 34 | 26 | 4 | 64 | 45 | 55 |
| LAF | Lafayette Tower | 8 | 0 | 0 | 8 | 8 | 10 |
| LAN | Lansing Tower | 19 | 2 | 6 | 27 | 18 | 22 |
| LAS | Las Vegas Tower | 29 | 17 | 2 | 48 | 33 | 40 |
| LAX | Los Angeles Tower | 36 | 10 | 0 | 46 | 41 | 50 |
| LBB | Lubbock Tower | 19 | 0 | 4 | 23 | 17 | 20 |

# Appendix B: Terminal Facility Controller Staffing Ranges

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| LCH | Lake Charles Tower | 11 | 0 | 8 | 19 | 14 | 17 |
| LEX | Lexington Tower | 22 | 1 | 8 | 31 | 22 | 26 |
| LFT | Lafayette Tower | 17 | 0 | 6 | 23 | 17 | 21 |
| LGA | La Guardia Tower | 29 | 5 | 2 | 36 | 27 | 33 |
| LGB | Long Beach Tower | 19 | 8 | 0 | 27 | 16 | 20 |
| LIT | Little Rock Tower | 20 | 5 | 10 | 35 | 24 | 30 |
| LNK | Lincoln Tower | 11 | 0 | 1 | 12 | 8 | 10 |
| LOU | Bowman Tower | 12 | 1 | 2 | 15 | 7 | 9 |
| LVK | Livermore Tower | 9 | 0 | 4 | 13 | 8 | 10 |
| M03 | Memphis TRACON | 28 | 6 | 5 | 39 | 34 | 42 |
| M98 | Minneapolis TRACON | 49 | 12 | 0 | 61 | 45 | 55 |
| MAF | Midland Tower | 16 | 2 | 10 | 28 | 20 | 24 |
| MBS | Saginaw Tower | 10 | 3 | 7 | 20 | 12 | 15 |
| MCI | Kansas City Tower | 40 | 6 | 2 | 48 | 29 | 36 |
| MCO | Orlando Tower | 26 | 2 | 1 | 29 | 21 | 26 |
| MDT | Harrisburg Tower | 20 | 3 | 7 | 30 | 22 | 27 |
| MDW | Midway Tower | 28 | 1 | 2 | 31 | 18 | 23 |
| MEM | Memphis Tower | 26 | 1 | 8 | 35 | 26 | 32 |
| MFD | Mansfield Tower | 9 | 1 | 10 | 20 | 14 | 17 |
| MGM | Montgomery Tower | 13 | 2 | 4 | 19 | 17 | 20 |
| MHT | Manchester Tower | 15 | 0 | 3 | 18 | 10 | 12 |
| MIA | Miami Tower | 72 | 14 | 12 | 98 | 81 | 99 |
| MIC | Crystal Tower | 15 | 0 | 0 | 15 | 7 | 9 |
| MKC | Downtown Tower | 13 | 0 | 4 | 17 | 11 | 14 |
| MKE | Milwaukee Tower | 38 | 7 | 12 | 57 | 41 | 51 |

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| MKG | Muskegon Tower | 16 | 0 | 5 | 21 | 15 | 18 |
| MLI | Quad City Tower | 10 | 0 | 4 | 14 | 13 | 16 |
| MLU | Monroe Tower | 8 | 0 | 5 | 13 | 11 | 13 |
| MMU | Morristown Tower | 11 | 1 | 4 | 16 | 9 | 11 |
| MOB | Mobile Tower | 21 | 2 | 4 | 27 | 19 | 23 |
| MRI | Merrill Tower | 12 | 0 | 1 | 13 | 9 | 12 |
| MRY | Monterey Tower | 8 | 1 | 1 | 10 | 6 | 8 |
| MSN | Madison Tower | 19 | 1 | 6 | 26 | 17 | 21 |
| MSP | Minneapolis Tower | 34 | 3 | 0 | 37 | 28 | 35 |
| MSY | New Orleans Tower | 32 | 6 | 0 | 38 | 30 | 37 |
| MWH | Grant County Tower | 9 | 0 | 7 | 16 | 14 | 17 |
| MYF | Montgomery Tower | 15 | 1 | 1 | 17 | 11 | 14 |
| MYR | Myrtle Beach Tower | 18 | 0 | 7 | 25 | 20 | 24 |
| N90 | New York TRACON | 156 | 17 | 15 | 188 | 178 | 218 |
| NCT | Northern California TRACON | 146 | 29 | 11 | 186 | 141 | 173 |
| NEW | Lakefront Tower | 8 | 0 | 2 | 10 | 6 | 7 |
| NMM | Meridian TRACON | 12 | 0 | 1 | 13 | 11 | 14 |
| OAK | Oakland Tower | 23 | 8 | 0 | 31 | 18 | 22 |
| OGG | Maui Tower | 11 | 2 | 5 | 18 | 10 | 12 |
| OKC | Oklahoma City Tower | 24 | 5 | 9 | 38 | 29 | 35 |
| OMA | Eppley Tower | 11 | 2 | 6 | 19 | 10 | 12 |
| ONT | Ontario Tower | 18 | 1 | 4 | 23 | 12 | 15 |
| ORD | Chicago O'Hare Tower | 56 | 17 | 0 | 73 | 54 | 67 |
| ORF | Norfolk Tower | 26 | 4 | 14 | 44 | 32 | 39 |
| ORL | Orlando Executive Tower | 12 | 0 | 2 | 14 | 9 | 11 |

# Appendix B: Terminal Facility Controller Staffing Ranges

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| P31 | Pensacola TRACON | 31 | 4 | 7 | 42 | 27 | 34 |
| P50 | Phoenix TRACON | 46 | 11 | 0 | 57 | 52 | 64 |
| P80 | Portland TRACON | 22 | 8 | 2 | 32 | 24 | 29 |
| PAE | Paine Tower | 11 | 0 | 4 | 15 | 9 | 11 |
| PAO | Palo Alto Tower | 7 | 1 | 5 | 13 | 9 | 11 |
| PBI | Palm Beach Tower | 33 | 5 | 9 | 47 | 41 | 50 |
| PCT | Potomac TRACON | 138 | 29 | 28 | 195 | 137 | 167 |
| PDK | DeKalb - Peachtree Tower | 14 | 3 | 3 | 20 | 11 | 13 |
| PDX | Portland Tower | 22 | 6 | 1 | 29 | 18 | 22 |
| PHF | Patrick Henry Tower | 11 | 0 | 2 | 13 | 9 | 11 |
| PHL | Philadelphia Tower | 75 | 19 | 6 | 100 | 72 | 87 |
| PHX | Phoenix Tower | 28 | 9 | 0 | 37 | 29 | 36 |
| PIA | Peoria Tower | 14 | 0 | 5 | 19 | 16 | 20 |
| PIE | St Petersburg Tower | 14 | 0 | 2 | 16 | 10 | 12 |
| PIT | Pittsburgh Tower | 45 | 0 | 3 | 48 | 33 | 40 |
| PNE | Northeast Philadelphia Tower | 11 | 0 | 6 | 17 | 8 | 10 |
| PNS | Pensacola Tower | 15 | 1 | 1 | 17 | 9 | 11 |
| POC | Brackett Tower | 9 | 1 | 1 | 11 | 7 | 9 |
| POU | Poughkeepsie Tower | 9 | 3 | 2 | 14 | 7 | 9 |
| PRC | Prescott Tower | 9 | 2 | 6 | 17 | 13 | 15 |
| PSC | Pasco Tower | 17 | 0 | 3 | 20 | 14 | 17 |
| PSP | Palm Springs Tower | 9 | 2 | 3 | 14 | 8 | 10 |
| PTK | Pontiac Tower | 15 | 1 | 2 | 18 | 10 | 12 |
| PUB | Pueblo Tower | 12 | 1 | 4 | 17 | 12 | 15 |
| PVD | Providence Tower | 24 | 1 | 4 | 29 | 23 | 28 |

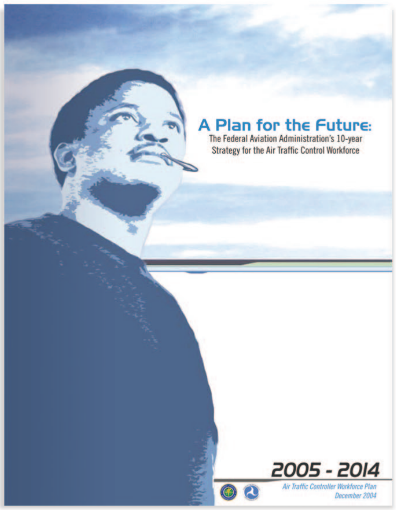
| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| PWK | Chicago Executive Tower | 12 | 1 | 1 | 14 | 8 | 10 |
| PWM | Portland Tower | 18 | 3 | 3 | 24 | 18 | 23 |
| R90 | Omaha TRACON | 21 | 1 | 1 | 23 | 18 | 21 |
| RDG | Reading Tower | 11 | 1 | 7 | 19 | 17 | 21 |
| RDU | Raleigh-Durham Tower | 41 | 5 | 4 | 50 | 35 | 43 |
| RFD | Rockford Tower | 17 | 1 | 4 | 22 | 19 | 23 |
| RHV | Reid-Hillview Tower | 10 | 0 | 0 | 10 | 9 | 11 |
| RIC | Richmond Tower | 16 | 0 | 2 | 18 | 11 | 14 |
| RNO | Reno Tower | 14 | 3 | 7 | 24 | 11 | 14 |
| ROA | Roanoke Tower | 23 | 0 | 7 | 30 | 21 | 26 |
| ROC | Rochester Tower | 23 | 2 | 6 | 31 | 19 | 23 |
| ROW | Roswell Tower | 12 | 0 | 7 | 19 | 14 | 17 |
| RST | Rochester Tower | 15 | 0 | 5 | 20 | 12 | 15 |
| RSW | Fort Myers Tower | 20 | 6 | 4 | 30 | 23 | 28 |
| RVS | Riverside Tower | 13 | 0 | 4 | 17 | 11 | 14 |
| S46 | Seattle TRACON | 43 | 14 | 2 | 59 | 41 | 51 |
| S56 | Salt Lake City TRACON | 33 | 8 | 6 | 47 | 35 | 43 |
| SAN | San Diego Tower | 27 | 2 | 0 | 29 | 15 | 19 |
| SAT | San Antonio Tower | 37 | 3 | 13 | 53 | 42 | 51 |
| SAV | Savannah Tower | 23 | 0 | 6 | 29 | 20 | 24 |
| SBA | Santa Barbara Tower | 22 | 6 | 6 | 34 | 22 | 27 |
| SBN | South Bend Tower | 14 | 2 | 9 | 25 | 17 | 21 |
| SCK | Stockton Tower | 9 | 0 | 1 | 10 | 6 | 8 |
| SCT | Southern California TRACON | 209 | 27 | 9 | 245 | 184 | 224 |
| SDF | Standiford Tower | 30 | 6 | 7 | 43 | 35 | 43 |

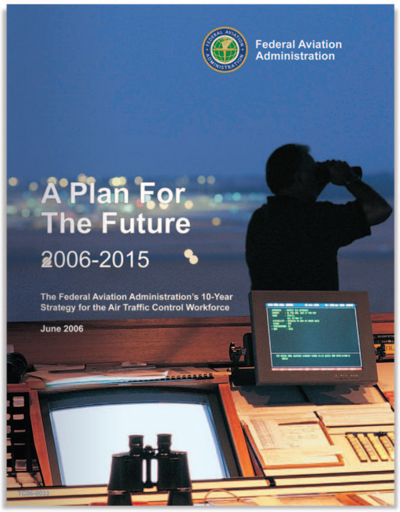
# Appendix B: Terminal Facility Controller Staffing Ranges

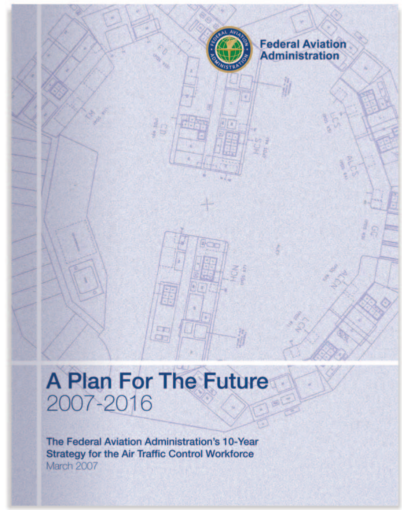
| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| SDL | Scottsdale Tower | 12 | 0 | 2 | 14 | 9 | 11 |
| SEA | Seattle Tower | 25 | 2 | 0 | 27 | 21 | 26 |
| SEE | Gillespie Tower | 15 | 2 | 1 | 18 | 10 | 12 |
| SFB | Sanford Tower | 17 | 3 | 1 | 21 | 15 | 18 |
| SFO | San Francisco Tower | 28 | 7 | 0 | 35 | 28 | 34 |
| SGF | Springfield Tower | 31 | 0 | 5 | 36 | 22 | 27 |
| SHV | Shreveport Tower | 14 | 0 | 8 | 22 | 21 | 26 |
| SJC | San Jose Tower | 15 | 1 | 2 | 18 | 11 | 13 |
| SJU | San Juan Tower | 17 | 1 | 4 | 22 | 14 | 17 |
| SLC | Salt Lake City Tower | 26 | 2 | 2 | 30 | 24 | 30 |
| SMF | Sacramento Tower | 12 | 0 | 1 | 13 | 12 | 15 |
| SMO | Santa Monica Tower | 11 | 2 | 4 | 17 | 8 | 10 |
| SNA | John Wayne Tower | 21 | 11 | 1 | 33 | 18 | 22 |
| SPI | Springfield Tower | 11 | 2 | 4 | 17 | 11 | 14 |
| SRQ | Sarasota Tower | 15 | 0 | 0 | 15 | 9 | 11 |
| STL | St Louis Tower | 22 | 2 | 1 | 25 | 16 | 20 |
| STP | St Paul Tower | 15 | 2 | 0 | 17 | 7 | 9 |
| STS | Sonoma Tower | 9 | 0 | 3 | 12 | 7 | 9 |
| STT | St Thomas Tower | 8 | 0 | 3 | 11 | 8 | 10 |
| SUS | Spirit Tower | 14 | 1 | 0 | 15 | 9 | 11 |
| SUX | Sioux Gateway Tower | 7 | 0 | 7 | 14 | 12 | 15 |
| SYR | Syracuse Tower | 18 | 2 | 7 | 27 | 21 | 26 |
| T75 | St Louis TRACON | 32 | 4 | 1 | 37 | 28 | 34 |
| TEB | Teterboro Tower | 16 | 1 | 6 | 23 | 18 | 23 |
| TLH | Tallahassee Tower | 19 | 4 | 4 | 27 | 18 | 22 |
| TMB | Tamiami Tower | 16 | 0 | 2 | 18 | 12 | 15 |

| | | Actual on Board as of 09/22/12 | | | | Staffing Ranges | |
|---|---|---|---|---|---|---|---|
| ID | Facility Name | CPC | CPC-IT | Developmental | Total | Low | High |
| TOA | Torrance Tower | 9 | 0 | 6 | 15 | 9 | 11 |
| TOL | Toledo Tower | 16 | 1 | 8 | 25 | 19 | 24 |
| TPA | Tampa Tower | 43 | 9 | 10 | 62 | 46 | 57 |
| TRI | Tri-Cities Tower | 18 | 1 | 4 | 23 | 16 | 19 |
| TUL | Tulsa Tower | 30 | 1 | 5 | 36 | 24 | 29 |
| TUS | Tucson Tower | 13 | 3 | 1 | 17 | 13 | 16 |
| TVC | Traverse City Tower | 7 | 1 | 2 | 10 | 8 | 9 |
| TWF | Twin Falls Tower | 7 | 1 | 3 | 11 | 7 | 9 |
| TYS | Knoxville Tower | 22 | 1 | 6 | 29 | 23 | 28 |
| U90 | Tucson TRACON | 15 | 4 | 3 | 22 | 17 | 20 |
| VGT | North Las Vegas Tower | 10 | 6 | 1 | 17 | 10 | 12 |
| VNY | Van Nuys Tower | 18 | 4 | 5 | 27 | 20 | 25 |
| VRB | Vero Beach Tower | 9 | 1 | 6 | 16 | 9 | 12 |
| Y90 | Yankee TRACON | 18 | 6 | 3 | 27 | 21 | 26 |
| YIP | Willow Run Tower | 11 | 0 | 5 | 16 | 10 | 12 |
| YNG | Youngstown Tower | 15 | 1 | 8 | 24 | 18 | 22 |

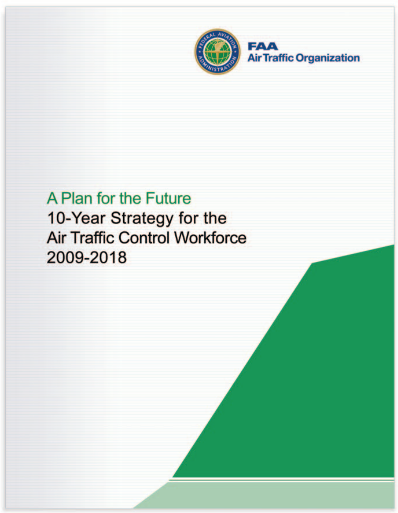
# Notes

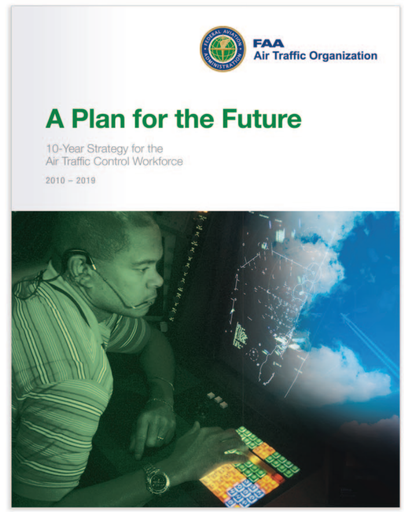


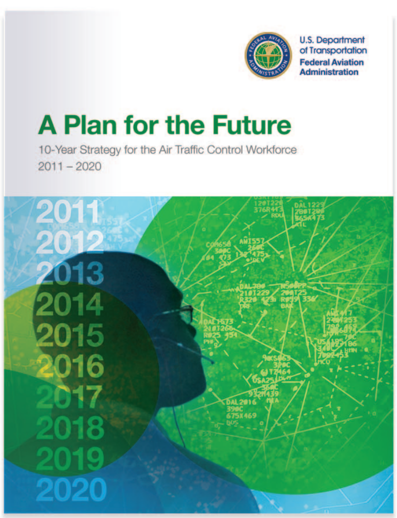



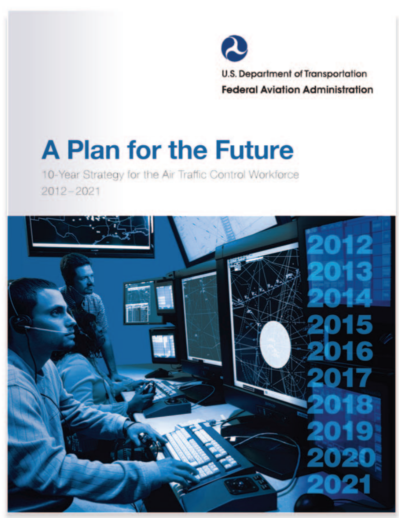








U.S. Department of Transportation
**Federal Aviation Administration**

800 Independence Avenue, SW
Washington, DC 20591

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